Our Wild Orchids

Frank Morris
and
Edward A. Eames

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Morris and Eames

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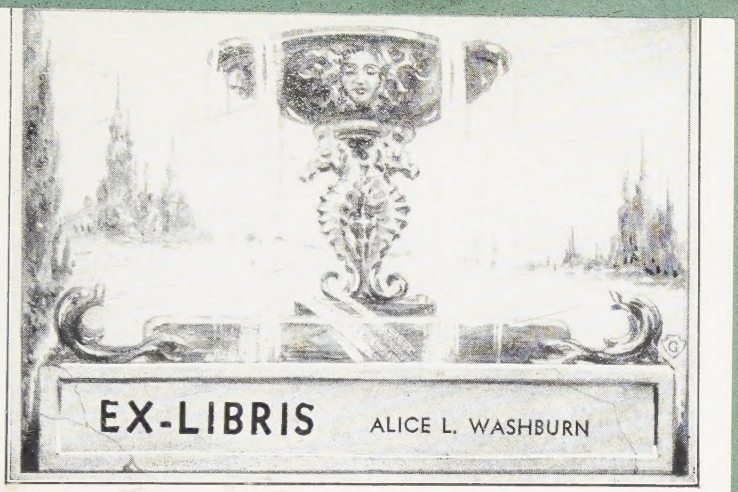
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OUR
WILD ORCHIDS

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Plate 1

SMALL PURPLE FRINGED ORCHID (*Habenaria psycodes*)

LARGE PURPLE FRINGED ORCHID (*Habenaria fimbriata*)

[See pages 158, 162]

OUR WILD ORCHIDS

TRAILS AND PORTRAITS

BY

FRANK MORRIS

AND

EDWARD A. EAMES

WITH FOREWORD BY OAKES AMES

Professor of Botany in Harvard University

NEW YORK

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1929

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TO

ELMA AND BELLE

COMPANIONS AND PARTNERS IN EVERY ADVENTURE

THE AUTHORS

AFFECTIONATELY DEDICATE THIS RECORD OF

OUR ORCHID TRAILS

FOREWORD

Since the publication of the last popular treatise devoted to the orchids of the United States and Canada, our knowledge of the group has been increased. We know more about the geographical distribution of the rarer species and the conditions essential to their welfare than we did ten years ago. New varieties have been discovered and new generic concepts have been proposed. In several of the larger genera the species have recently received critical study. This being true, there is a pressing need for a new popular treatise that will embody the results of recent research. The present volume supplies this need in large measure. The authors have given close attention to their chosen group and their conscientious enthusiasm, sustained for many years, has carried them to remote places to secure first-hand knowledge of the conditions under which orchids grow.

Our native orchids are retreating before the advance of agriculture and some of them are already threatened with extinction. It is a matter of common experience that orchids are intolerant of the conditions that are coexistent with agricultural operations and the spread of civilization. Indeed within the memory of men still living the geographical range of many species has been greatly altered. In making careful photographic records of the species in their natural environment, the authors have rendered a notable service to orchidology. As time passes such records may be the only means of refreshing our memory with regard to the appearance of the rarer orchids in their native homes.

Perhaps the authors of Our Wild Orchids see in the delicate and intricate structure of the flowers a conscious purpose which the professional biologist will disclaim, but the defiance of purely scientific points of view is welcome if it intensifies the desire to observe and stimulates a keen interest in fundamental structures.

Oakes Ames.

North Easton, Massachusetts,
September 17, 1929.

AUTHORS' PREFACE

Our book of native orchids is intended first of all for amateurs like ourselves; lovers of outdoor life and the world of nature, drawn to the observation and study of wild flowers for their beauty as living things. We hoped by bringing together the results of many years' active field work, to provide a readable account of these fascinating and often strangely beautiful flowers for others of similar tastes to our own.

It was a very modest plan that we had at the outset—just to form a nodding acquaintance with as many of these cousins to the lilies as lived within reach of us. In those days we were not four, but two and two, hunting orchids in couples—separately. And then our paths met, and we stopped to compare notes with each other. Both halves of our foreordained partnership had much the same tale to tell. One day while roaming the woods we had suddenly come upon a mass of Lady Slippers in the full glory of their bloom. With the thrill of the sight, there sprang into being full-grown a double ambition—to find every sort of Lady Slipper known in the land, and all the clans and tribes of kindred flowers owning the family name of Orchid. And here all the fun—and our troubles—began.

But the delight of giving a special bent to our hobby and seeing our difficulties vanish in flocks at every find we made was too good to be kept to ourselves. And the happy thought came to us to *blaze* a set of trails through the length and breadth of Orchidland so that others would find it easy and pleasant to follow our footsteps.

Our foursome once made up, we mapped out a definite plan for ourselves. With an extra slice thrown in for luck our course was enlarged to take in the whole of Gray's Territory—from Tennessee up the Mississippi Valley to Minnesota, across Canada from

Thunder Cape to the Straits of Belle Isle, and down the Atlantic Coast to North Carolina. All the orchids known to occur within these limits became our objects of search; the Eames plan of a camera record was wedded to the Morris practice of an author's pen; and the two equal halves of our partnership, stories and portraits, picture gallery and guide, were rounded out into an Orchid Book.

To illustrate our work by a series of studio portraits would have been the easiest thing in the world. But from the standpoint of Natural History we felt the worth-while thing was to make field pictures—often the first on record—of every orchid in its natural setting of bog, thicket, or meadow; and the camera-man has devoted years to the study of this difficult art.

Every one of our six dozen orchid-trails, illustrated with field photographs, both habitat and portrait, has been made the subject of a separate article. In each we have recorded all the popular and technical names, and made careful pen-pictures from the life, descriptions of native haunts, lists of plant-companions, and notes of range and season. Finally, to add to the interest, we have put our account into story form, with all the fun and adventures of the actual trip, and our manifold contacts with living nature—ferns, flowers, insects, birds, and beasts.

With Gray's Flora to model upon, we have set the whole series in systematic order; the Tribes and their Clans or generic groups being arranged in natural sequence, with the membership of each Clan so disposed as to be easy of identification. The pictures alone will in most cases serve to determine the various orchids; but an earmark or outstanding feature has been stressed in each of the small-print headings. And for rapid reference these have been gathered in a series of Keys, along with an account of the Orchids and their Kin among wild flowers, the four Tribes, and their component Clans.

Our book may almost be said to have written itself, so actively have the interests of all four been bound up with blazing the

trails. Between first inception and final revision the pen-man's chapters owe much of their present form to thoughtful and suggestive criticisms made by his colleagues; three or four of the articles are entirely the outcome of field-notes supplied by the camera-man, and there is hardly a page but embodies some happy thought born of mutual council.

Outside our fellowship of four, it has been a great pleasure to find the friendliest of spirits wherever we went. No sooner was our errand known than "the brotherhood" stepped eagerly forward to help. Professional botanists, in spite of their arduous duties, took time to give us a hearing; amateurs put their local records at our service and proffered their guidance; everything was done to crown our quest with success. Most of our friends, we know, will feel amply repaid in the publication of our book; but whether or no, we wish to thank all who have assisted us in any way, most heartily, for their kindness.

To Professor M. L. Fernald of the Asa Gray Herbarium at Harvard we are much indebted for valuable information, most of all for setting us on the trail of the "Newfoundland Orchid." To Professor Oakes Ames our whole book is a record of debt. His Revision of the Orchids in the latest issue of Gray's Manual has been pored over and thumbed for twenty years; and the "Enumeration" has been a *vade-mecum* since its issue five years ago. These volumes, as well as his monographs on the Habenarias and Pogonias, we have been invited freely to draw upon, with all their close-packed stores of knowledge. In addition to this Professor Oakes Ames and his assistant Mr. Chas. Schweinfurth have kindly looked over our pages of commentary on the Orchids, their Tribes and Clans, and have helped us prepare our Keys. To our personal friendship with Dr. Edgar T. Wherry of the Bureau of Chemistry, Washington, D. C., we all owe many a delightful day in the field together; his astonishing familiarity with rare orchids and their stations has been invaluable to us in our southern trips. The writer of the chapters is especially grateful to

Doctor Wherry for clearing up moot points of nomenclature, preparing a list of orchid soil-reactions and giving him access to the Huger collection of household names current among the southern mountaineers. He wishes also to thank Mr. Albert Lownes of Rhode Island for procuring him his first meeting with the "Three Birds" at Squam Lake, N. H.; and Mr. M. S. Baxter of Rochester for his first sight of the Lily-leaved Twayblade. To Brother Marie-Victorin of the Université de Montréal we owe thanks for sketch-maps of his rare orchid stations at the Mingan Islands; also to Doctor Malte of the Victoria Museum, Ottawa, and to Professor Cowles of the University of Chicago for putting us on the track of the Bog Malaxis at Thunder Cape. For much of our successful field work in New York State we are indebted to Dr. Homer D. House, the State Botanist; and to Mr. Otway Brown of Cape May for signal services in both our New Jersey campaigns. Nor can we fail to mention the many acts of kindness and hearty support accorded us by our good old friend, Mr. H. Walter Child of Boston; his generous encouragement has been a real inspiration from early days, and to his rare knowledge of the New England orchids we and our book are indebted for many a valuable suggestion.

FRANK MORRIS,
EDWARD A. EAMES.

INTRODUCTORY

ORCHIDS AND THEIR KIN

To see a Yellow Lady Slipper among Bellworts and Trilliums, or a Butterfly Orchid side by side with a Turk's Cap Lily, except for the marks of a six-parted perianth, you would never guess they were cousins. Yet so it is. The descent of the Orchids from Lily-like ancestors reads as a most fascinating chapter in the story of Evolution; and it took the genius of Darwin to interpret the many curious "vestiges of natural creation" revealed by a close study of the Orchid blossom and relate them to his theory of Cross Fertilization by Insects.

The Lily is as famous for simple grace and symmetry as the Orchid is for fantastic, bizarre shapes. Yet they are both modelled on the same plan of a "three-parted flower." Originally the Orchids like other members of the Lily Family possessed a perfectly regular bloom in five concentric and contiguous alternating whorls of three parts each, all crowded on to the little disc of their pedicel top. Side by side in the centre stood three flask-shaped vessels (carpels) containing the embryo seeds, all three narrowed above into an erect neck called the "style" and terminating in a sticky tip or "stigma" designed to catch the pollen or fertilizing grains from the anthers surmounting the stamens. Immediately surrounding these came two alternate whorls of three stamens each, the inner ring interspacing the carpels, the outer one opposite to them. These inner rings of three times three made the true flower; and beyond them again came the perianth, "surrounding the flower," in two alternate whorls of three, the corolla or inner ring of petals usually colored for show, and the calyx or outer ring of sepals to protect and sometimes adorn as well.

Various steps in advance of this primitive pattern were made by the Lilies themselves. The carpels were united into a "pistil," a

single ovary narrowed above into a stigma-tipped style; and for better display the flowers were made larger and brighter, the sepals uniting with the petals to flag the insects from a distance. Another great change can be seen in the Amaryllis; the four outer whorls of stamens and perianth were set on the top of the ovary surrounding the style, instead of at the base. A still more important departure was to break the radial symmetry of the perianth. This device originated lower in the scale than the Lilies, as witness the Day-flower and the Pickerel-weed; but it is just as well seen in flowers that stand at the top of the ovary; for instance, the Montbretia and the Gladiolus, both members of the Iris Family.

There still remains a great gap between the Lilies and the Orchids, but it is partly filled by two very interesting members of our native flora, the Burmannia and the Thalia. The first of these is in some respects so closely allied to the Orchids as to be included in their Order. Its seeds like theirs are multitudinous and minute as particles of dust. Furthermore the three stamens are so dwarfed that the anthers are almost sessile. This curious kinsman is often found in close companionship with our orchids in the peat bogs of Virginia. The Thalia occurs in the marshlands of Missouri and Carolina; it belongs to the same Order as the tropical Banana, Ginger, and Arrowroot, a group of plants we should know by their fruits and tubers rather than by their flowers were it not for a single member whose highly ornamental blossoms make it a favorite in every garden—the Canna. To examine the bloom of an "Indian Shot" as Southerners call it, makes the very best of introductions to a study of the Orchid, because of what it has done with its stamens. In order to attract the bumble-bee to its scentless flowers and at the same time concentrate both pollen and stigma in the path of its insect visitors, it has turned every one of its stamens into petals, much larger and showier than the lobes of its true corolla; and its pollen is all stored in a single half-anther borne on the margin of one of these rich red "petaloid staminodes"—to quote the botanies.

And what has the Orchid done? Examine the flower of a Yellow Moccasin or a Purple Fringed Orchid. Where are the fifteen parts, the five alternate whorls of three that it bore in its lilyhood days of radial symmetry? As soon as it tilted on edge and became a face looking out for insect visitors its flower was divided into two equal halves, an upper and a lower. In the upper half were two stigmas, one inner stamen, two outer stamens, one petal, and two sepals; in the lower half, one stigma, two inner stamens, one outer stamen, two petals and one sepal. To perfect the flower for insect pollination the inner whorl of three stamens and the middle one of the outer whorl were incorporated with the style into a single fleshy body known as the column; the lateral pair of stamens in the outer whorl were converted into showy petals and made connate with the middle lobe of the corolla which stood between them; to make a landing stage for insects, a spiral twist was given to the ovary-pedicel at the ripe hour of the opening bloom, so that column and perianth took a half turn; and the glorified mid-petal, originally in the upper half of the flower, was swung into position as the lip underneath the column; a nectar-well was sunk at its inner end and the pollen-bearing anther (or anthers) and stigma at the top of the column stood over the nectary.

The effect of welding the three stamens of the inner whorl and the middle one of the outer whorl into a single body with the style was to concentrate the anthers alongside the stigmatic discs at the head of the column, so fixed that the pollen could not reach the stigma unaided, so near that an insect visitor, between approaching and leaving the nectary, would come in contact first with the stigma and then with the pollen. It had another important effect, that of reducing still further the number of fertile anthers and adapting the spare parts to other uses. All the orchids without exception sterilized the middle stamen of the inner whorl and used its body to reinforce the column. But at this point came disagreement and a great parting of the ways.

The Lady Slippers made the lateral pair of inner anthers their producers and storers of pollen, and sterilizing the middle anther of the outer whorl converted it into a large fleshy shield covering the anthers and stigma; they also maintained all three stigmatic discs in active service. The other orchids made the middle outer anther their sole pollen-producer and sterilizing the lateral pair of inner anthers pressed them into the service of their fertile brother as a cradle (*clinandrium*) for its safe keeping. Another important piece of economy was to reduce the number of active stigmas to two and convert the third into a new and very important organ—the *rostellum*, a little beak of glutinous matter situated immediately above the bi-lobed stigma and below the pollinia. A caudicle or "little tail" of elastic threads connects the pollinia with a pair of sticky discs in the rostellum; these are plastered on to the head of the insect as it reaches into the nectary, and as it withdraws it pulls the pollinia out of their socket and conveys them to another flower. Thus, as Darwin concludes, the office of the rostellum is still to secure the pollen-masses, but indirectly by means of their attachment to an insect's body. Everything points to the truth of his explanation—the relative position of anther, rostellum, and stigma, the identity of character between the viscid discs and the secretion from the fertile stigma, and the total absence of a rostellum, even rudimentary, on the column of the Lady Slippers.

THE FOUR TRIBES

It is by their anthers and pollen-masses, according as these differ in number, character, and position, that the various clans or generic groups of orchids are gathered into the larger unity of Tribes. In each Tribe botanists have selected a leading clan as a type. Our orchids are all grouped in one or other of four Tribes.

I. The Tribe of the Lady Slipper (*Cypripedieæ*); named from the famous clan of *Cypripedium*, a group almost exclusively North American and Asiatic, remarkable for the shape of their lip—an inflated shoe—with the overlap folded *inward* near the back of the opening or hatchway at the top. The only orchid that could be mistaken for a Lady Slipper is the Calypso; but, besides having no more than a single fertile anther, it has the forepart of its shoe cleft into a pair of toes, and the overlap folded *outward* in front—an embroidered apron for insects to cling to. The Tribe contains but one generic group

i. The Lady Slipper (*Cypripedium*).

II. The Tribe of the Eyebrow Orchid (*Ophrydeæ*); named from the European clan of *Ophrys*, a spurless group noted for the extraordinary resemblance of their lips to bees, wasps, hornets, flies, and spiders. This Tribe includes the spurred group whose pair of biennial tubers early excited human curiosity and earned them the name of *Orchis* nearly 2500 years ago. All the North American members of the Tribe are spurred; and the only other of our orchids with a well-developed free spur—the Crane-fly—can readily be distinguished by its basal leaf; it is purple beneath, makes its appearance in the autumn, remains

green throughout the winter, and withers away in early summer before the flowering season.

ii. The Orchis (*Orchis*).
iii. The Rein-orchid (*Habenaria*).

III. The Tribe of the Bird's Nest Orchid (*Neottieæ*); named from the European clan of *Neottia*, a curious saprophyte with matted roots and a forked lip, common in English beech woods. This Tribe contains a large number of very different-looking groups; in some the lip is flat and cleft into two at the apex much like the British Bird's Nest Orchid (Twayblades); in others the lip is conspicuously crested on the face (the Pogonia group); or it is upcurved at the sides to form a groove as with the Ladies' Tresses; or the basal half is sunk into the form of a pouch. Only one of our orchids is now included under "Pogonia" —the Snake Mouth or Rose Pogonia; but as the others formerly known as Pogonias are nearly all monotypic in our territory, we have included their specific name in enumerating the groups. All but three of the Tribe have fleshy fibrous roots; the three that are tuberous-rooted may be distinguished from corm-bearing members of Tribe IV by their flowers and foliage both. The Three Birds or Nodding Crest-lip has three or four flowers that open successively, triple-crested with grass-green on the lip, and a scoop-shaped leaf at each joint of its stem; the Arethusa and Grass Pink have large magenta flowers, handsomely crested, either solitary or few, and a linear leaf like a grass-blade at their base.

iv. The Twayblade (*Listera*).
v. The Crest-lip (*Pogonia*).
vi. The Spreading Funnel-crest (*Cleistes*).
vii. The Whorl-crest (*Isotria*).
viii. The Nodding-crest (*Triphora*).
ix. The Arethusa (*Arethusa*).

x. The Grass Pink (*Calopogon*).
xi. The Helleborine (*Amesia*).
xii. The Ladies' Tresses (*Spiranthes*).
xiii. The Rattlesnake Plantain (*Epipactis*).
xiv. Ponthieu's Orchid (*Ponthieva*).

IV. The Tribe of the Tree Orchid (*Epidendreæ*); named from the New World clan of *Epidendrum*, a sub-tropical epiphyte abundant in the "hammock" formations of the Florida Everglades and extending into South Carolina. The members of this Tribe with us are distinguished by their corms and coralloid roots. Several of them are saprophytes, destitute of foliage; in the others the leaves are all basal, small, few, or solitary. Several orchids of unusual interest are included in the Tribe. Five occur on both sides of the Atlantic; the "Bog Orchid," an Adder's Mouth, is the smallest as well as one of the rarest of the whole family; the Northern Calypso or Fairy Slipper is the most wonderfully beautiful of all our terrestrial orchids; the Striped Coral Root and the Cock's Combs or Crested Coral Root are noted for the rich colors of their flowering spike, the one madder and creamy white, the other purple and buff.

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I

TRIBE OF THE LADY SLIPPER

GENUS

I. Lady Slipper . . . . . *Cypripedium*

I

LADY SLIPPER (*CYPRIPEDIUM*)

1. RAM'S HEAD LADY SLIPPER

(*Cypripedium arietinum*)

NAMES: COMMON: Ram's Head, Steeple-cap. GENERIC: *Cypripedium* (Linnæus, circ. 1753), "Venus' Slipper," an "un-christening" of the older *Calceolus Mariæ*, "The Virgin Mary Our Lady's Slipper"; SPECIFIC: *arietinum* (R. Brown, 1813), "ram-like."

PLANT: 6–13 in. high, leafy. LEAVES: narrow-oval, blunt, smooth, slightly *bluish* green.

FLOWERS: Solitary. SEPALS: dark purplish brown edged with green, 1 in. long: upper one, lance-ovate, taper-pointed; lateral pair, lance-linear. PETALS: similar, but narrower and slightly wavy-twisted. LIP: whitish, boldly netted with crimson and shading below into a greenish-yellow tip; mouth of sac woolly with white hair; ½ in. in length, prolonged downward on outer half into a conical pouch.

PLACE AND TIME: DISTRIBUTION: Quebec and New England west to Manitoba and upper Mississippi Valley; much commoner northward. HABITAT: chiefly peat bogs under tamarac and cedar; also in shade of white pine and other conifers. SOIL PREFERENCE: sub-acid, but tolerant of neutral. SEASON: end of May to mid-June or later.

SPECIAL FEATURE: Pair of lower sepals entirely separate.

THIS is the smallest of our Lady Slippers and the least conspicuous; but its unique form and its rarity together lend it an interest out of all proportion to its size and showiness. The name "Ram's Head" is, of course, fanciful, like "Moccasin," "Crane-fly," "Bee," "Spider," and scores of other household names applied by the white man to his native orchids; but it is not at all inappropriate, and well deserves a place among the folk-names of North American wild flowers. From bulging brow to

tapering chin, the blossom is in outline not unlike the tiny head of a ram; and the idea, once born, is speedily caught up, you will find, and fancy-bred into vigor: what indeed are the curling streamers at the sides but a winding pair of crumpled horns?

It has, too, like all the Lady Slippers, a singular beauty of its own; but one that invites the fond look of a lover rather than the hasty glance of some prize-hunting vandal. To be really seen, it must be looked at from a level as the camera looks at it, and preferably in profile. Those who step carelessly through its haunts, casting casual glances downward, may indeed discover the flower, but they will miss all its beauty. The vertical set of the downward-tapering cup is self-concealing; and even the bold round of the bulging brim is hidden from above by the broad sombre-shaded sepal jutting out over it like a protecting shield.

Though much smaller, the whole plant closely resembles the Small Yellow, being barely a foot high and leafy-stemmed; the three or four leaves, however, are somewhat narrower in proportion and more bluish in their shade of green. The flower is of unique interest botanically by reason of its primitive form, the two lower sepals not being welded into a single broad one beneath the lip as is the case with all the other Lady Slippers. The cup is thus flanked by *two* pairs of similar streamers, long, narrow, and wavy, but not spirally twisted; all four, like the broad upper sepal, dark madder-brown in color. The lip is thrust out horizontally on a spatulate base, and its "cup" hangs vertically down in the form of a conical pouch, being broadest above round the brim and narrowing below to a blunt tip. It looks not unlike a cap hung upside down and hind part before, a fairy cap with steeple crown and the brim pulled out into a long projecting peak. Its ground color is whitish, but the whole surface is ornamented with a network of broad vertical and cross lines of rich crimson; it is woolly above with snow-white hair, and shades toward the tip into yellowish-green.

The blossom is shorter-lived than most of the Lady Slippers,

Plate 2

RAM'S HEAD LADY SLIPPER

(*Cypripedium arietinum*)

and the moment it is fertilized a curious thing happens; the overarching sepal is lowered and presently settles down over the mouth of the cup like a lid, effectually sealing the casket of treasure to all pilferers of nectar and pollen.

In general, the Ram's Head loves to grow upon hummocks at the base of tamaracs, or under the shelter of cedar and spruce; it is distinctly a plant of old rich mossy bogs, and more often than not will be found in well-shaded areas of such cover. It has little liking for those low wet places that the Big Pink-and-Whites love or the dry rocky haunts of the Rose-veined Moccasin Flower; nevertheless, there are not a few records of it as growing in "dry upland woods under conifers," and we can bear this out from personal experience.

In most parts of the United States the Ram's Head is so rare that the lover of wild flowers would gladly go a long journey to see it. Indeed two of us, determined to find this shy little beauty in our own home State, spent several seasons tramping and travelling weary miles through thicket and bog before we finally ran it to earth. At last a lucky clue—an interchange of letters—a run by motor to Jordanville in Herkimer Co.—an intensive search and—the Ram's Head was cornered. Two half-grown plants, each with a tiny bud, were found. These were carefully brought to Buffalo and planted in a local bog, where they continued to develop until it was possible to secure a good picture of the pair. Since then, with the knowledge gained of its *appearance in the field* and *habitat requirements*, we have found it at other stations in New York; indeed, at one of these places, near Lake Bonaparte in the Adirondacks, it is actually abundant.

The plant has a wide northern range and is fairly plentiful in certain parts of Ontario. Within a few miles of our home town of Peterborough, we know of a dozen or more stations where this quaint little flower may be counted in scores. But its flowering season is so short and the plant—even in bloom—so inconspicuous, that, while fairly abundant, it is almost unknown. Many quite diligent field botanists, living within a stone's throw as it

FIG. 1. — LOCALITÉ DE LADY-LOVELAR
(Ile Stradbroke)

were, have never seen it. We ourselves, the Ontario members of this orchid-hunting partnership, were lucky enough to discover it in our second season's rambling, and thus early learned its appearance and fugitive habits; but even so, we have overlooked it again and again in questing through the bogs.

Indeed in the big swamp where some of our recent pictures were taken, it was more or less by accident that we first discovered how abundantly it grew. The photographers were coming over to make a series of Ram's Head pictures, and we hurried out to size up the prospects.

A vague memory of stray specimens, barely noticed in passing, led us to a cedar thicket well on the home side of "Weasel Creek," the recognized further limit of our orchid paradise. Sure enough, on reaching the spot we soon found what we were looking for,—at first, scattered plants; but presently, in a deeply shaded mossy aisle, some lovely clumps with five or six buds apiece just ready to bloom. After feasting our eyes with these we pushed on till we came to a break in the cedars, marking probably an old winter road long obliterated. Here in the wagon-wide gap as well as in a little clearing beyond, partly grown up with young tamaracs, among patches of Labrador Tea, sedges and other protective cover, we found Ram's Heads luxuriating in scores. Struck by their obvious fondness for tamarac at this station, we crossed to the far side of the clearing where a broad belt of these trees stood untouched.

Had you been playing "Tom Peep," our next move might well have puzzled. For hardly had we disappeared among the trees before we broke into the clearing again, thrust a long ram-pike of cedar deep into the heart of an ant-hill, and then made a bee-line due south by the compass to the familiar old corduroy road; here we blazed a friendly balsam into a finger post, and doubling back to the ant-hill stepped aside to enjoy at our leisure a most extraordinary sight.

Under the trees, especially where the soil was slightly heaved by the underlying roots, among mosses and ferns, Twinflowers,

Pitcher Plants, Pyrolas, Bunch-berries and Heaths, in sun and shadow and all the chequered loveliness of an orchid bog in June, stood hosts of blossoming Ram's Heads. Without moving, we actually counted at one spot over a hundred blooms within a radius of two or three yards. Such a lavish display of this rare little flower seemed almost beyond belief; and to our delight in the sheer beauty of the scene was added the thrill of discovery—that touch of romance which marks all the best of our outdoor hobbies.

II. YELLOW LADY SLIPPER

(*Cypripedium parviflorum*)

NAMES: COMMON: Yellow Lady Slipper, Yellow Moccasin, Golden Slipper, Water Stealer, Noah's Ark, Whip-poor-will Shoe. SPECIFIC: *parviflorum* (Salisbury, 1791), "small-flowered"; var. *pubescens* (sp. Willdenow, 1804; var. Knight, 1906), "downy"; var. *planipetalum* (Fernald, 1926), "flat-petalled."

PLANT: 9–27 in. high, leafy, pubescent. LEAVES: 2–6 in. long, broad oval to lanceolate, ciliate on veins and margins.

FLOWERS: 1–2; on tall slender peduncles, very fragrant in smaller forms. SEPALS: deepest crimson-purple to pale greenish yellow, lance-ovate; upper one, 1⅓–2 in. long; lateral pair, rather shorter and narrower, united into one below the lip with separate tips. PETALS: colored like the sepals, lance-linear, strongly spiralled (exc. *C. planipetalum*), 1½–2¼ in. long. LIP: golden-yellow, smooth and polished, egg-shaped, ⅔–2 in. long.

PLACE AND TIME: DISTRIBUTION: transcontinental, Newfoundland–Georgia, west through Rockies to British Columbia and Washington. HABITAT: boglands, banks, and rich woods. SOIL PREFERENCE: indifferent, thrives in both neutral and acid soil. SEASON: May–July.

SPECIAL FEATURE: Lip golden.

EVERY one knows the Yellow Lady Slipper. Adaptive and hardy enough to have spread from its native swamp to upland wood and grassy bank, it takes quite kindly to cultivation and is abundant wherever conditions are at all favorable. Moreover, with us it has a flowering season that extends through two full calendar months (May 15–July 15). Common as it is, we can hardly help being thrilled by its wonderful grace and beauty.

Plate 4

SMALL YELLOW LADY SLIPPER

(*Cypripedium parviflorum*)

Thanks, too, to our long northern winter and the miracle of spring, the sight of it season after season is as fresh as in the dawn of Creation. In all probability, were it as rare as its British congener (*Cypripedium calceolus*), we should not hesitate to proclaim it one of the most beautiful of flowers and queen of the Lady Slippers.

The plant ranges from less than a foot to over two feet in height. The stem is fairly stout and furnished with three to five alternate, spreading leaves, clasping at the base, oval, pointed, and ribbed with parallel veins; from the topmost leaf-axil springs a tall, slender, naked stalk surmounted by the flower; the sepals and petals as well as the green bract behind serve to throw into bold relief the lip or cup in their midst. This cup is the "yellow slipper" which gives the plant its name, a big full-blown balloon of pure burnished gold, egg-shaped and smoothly rounded. It is the middle one of the three petals, and at its sides appear the other two, a pair of long and narrow flowing spirals, usually yellow-green and inconspicuous, but often of a rich dark tea-color in beautiful contrast to the golden slipper between them. Above and below are the sepals, colored like the petals; the upper, broad and pointed, jutting out over the cup; the lower pair, united into one, but with twin tips, supporting the cup from beneath.

In this Lady Slipper more than in any of the others, one is struck by the elegance and grace of proportion. From the ground up, it is remarkably pleasing to the eye; the broad leafy pedestal of restful green; the slender soaring shaft of the flower-scape; and, floating at the summit, that full-blown bubble of gleaming gold, with its pair of richly colored spirals flowing at the sides. If one thing more than any other gives distinction to the Yellow Lady Slipper, it would really seem to be, not the curious form of the flower, its rich colors or its fragrance, but the length of the slender stalk at whose summit it is poised. This feature is quite unique and almost as remarkable in the double-blossomed stems as in the single.

The lip is so strongly inflated as to be resilient to the touch like a full-blown bladder. Often the membrane seems actually strained to the breaking-point; at the back, below, there will nearly always be found a translucent patch, and it is here that the blossom first begins to wither. The stem and foliage are downy with fine soft hairs. It is these, apparently, that cause in some people an annoying irritation of the skin, similar to that produced by the Japanese Primula, though, strangely enough, many of the victims believe the cause to lie in the blossom itself.

Like all bright-colored flowers, it loves to bask in the sunshine, while growing within reach of the shade and rooted in rich leaf-mould. It is so often found "posing" in front of some dark screen of shrubbery, that you would almost swear it had the art of choosing its proper setting. In the swamps it avoids thickets, and when once it has found a favorable station, it multiplies rapidly into crowded clusters of twenty or thirty stems. On banks and in woods it usually grows singly or in small groups.

Its community habit and love of sunlight are well illustrated in one of our pictures. This was taken in a typical "peat bog" of central Ontario, lying only a few miles from our home and naturally a favorite resort in the season of flowers. It is a bog of large area and embraces so many different kinds of cover that twenty species of orchid flourish within it and ten more on its borders. The clump we photographed was one of two, both growing on the edge of a wooded tract. They were discovered one day in mid-June as we trudged past with the camera to some neighboring colonies of the Small Round-leaf Orchis (*Orchis rotundifolia*).

Extremes of the Yellow differ so remarkably in form and color that many botanists distinguish three kinds. It seems best to include them all in a single species of very variable habit. About the Gulf of St. Lawrence is a flat-petalled form (*C. planipetalum*) that closely resembles the European *C. calceolus*; and then there are two extremes of our familiar Yellow Lady Slipper with long-spiralled tresses—the Large and the Small. The typical

Plate 5

LARGE YELLOW LADY SLIPPER

(*Cypripedium parviflorum* var. *pubescens*)

Plate 6

LARGE YELLOW LADY SLIPPER

(Cypripedium parviflorum, var. pubescens)

form (*C. parviflorum*) is a small plant with fairly smooth leaves and stem, dark madder-brown sepals and petals, and a slender lip an inch or less in length. The variety, *C. pubescens*, is a much larger plant, conspicuously downy, with pale perianth-parts and a bulging lip 1½ to 2 inches long.

The Large Yellow is far the commoner plant, flourishing equally in swamps, on banks, and in woodland cover. The Small Yellow is much daintier and seldom strays from its favorite haunt of the bog, where it thrives in moist sheltered nooks, embedded in the rich black peat.

It was in just such a station that we found it a few years ago, plants of a peculiarly pleasing form, typical and distinctive. We had been told more than once of a swamp to the north "just teeming with Showy Lady Slippers"; and as these orchids invariably choose the richest of bogs for a home, we determined one day to pay it a visit. The approach to this "Land Delectable" was one of the roughest we had ever travelled, through a starveling growth of poplar and stunted oak, over rocky ridges and limestone flats in weary and apparently endless succession. Suddenly, we dipped down into the heart of a deep, rich, mossy bog, well wooded with tamarac, spruce, hemlock and cedar. Two or three old logging roads, intersecting each other not far from the highway, offered a ready means of exploration.

Though it was as late as the second week of June, we found Ram's Heads still in blossom, along with Yellow and Rose-veined Moccasins; while everywhere the Showy Lady Slipper had shoved up in great clumps of thick leafy shoots. There were also, in the loose sphagnum, Arethusas and the little Heart-leaved Twayblade (*Listera cordata*); while some way in, under the evergreens, we came upon the Small Round-leaf Orchis, Loesel's Twayblade (*Liparis Loeselii*), and several species of Rein-orchid (*Habenaria*). The Ram's Head was most abundant in the margins of a very wet rough old wagon track that had cut through peat and moss and shrubs of heath. But what attracted our attention still more was its companion, the Small Yellow; its flowers

Plate 7

FLAT-PETALLED YELLOW LADY SLIPPER

(*Cypripedium parviflorum, var. planipetalum*)

were very diminutive, the sepals and petals extremely dark, the slippers of the very slenderest—long and narrow, their pale gold offset in sharpest contrast by the perianth of deep brown-purple or madder. They were typical Small Yellows and of a perfectly pure strain; search where we might, we could find no trace of the large form. A peculiar feature about them all, apart from their being so tiny, was a heavy splash of crimson purple on the *outside* of the cup, just forward of the opening. This royal birthmark proved later to be hereditary in the pigmy Yellows of this bog; they were, in fact, a genuine local race.

All bog-trotters will envy us the hour or two we spent in this cover, so handy to the highway that we simply stepped out of the car among Lady Slippers and there we were; tamarac to the west, cedar and spruce to the east, sphagnum and orchids everywhere. It was a regular revel, up and down the logging roads among Labrador Tea and American Laurel, in and out through cedar aisles and cloistered spruce, discoveries at every turn. "Do you know?" said the photographer as we trudged back to the car, "I'm going to name that—"Cypripedium Bog."

III. WHITE LADY SLIPPER

(*Cypripedium candidum*)

NAMES: COMMON: White Lady Slipper, Silver Slipper, Violet-veined White. SPECIFIC: *candidum* (Muhlenberg ex Willdenow, 1805), "white."

PLANT: 6–12 in. high, at some stations more; leafy-stemmed. LEAVES: lanceolate, sharp-pointed, strongly ribbed, 3–7 in. long; often nearly erect, rigid, and sheathing.

FLOWERS: 1–2, on fairly long peduncles, fragrant. SEPALS: greenish yellow, sparsely or sometimes thickly overlaid with dark crimson-purple stripes; upper one, 1 in. or more long; lateral pair, welded into one, with twin tips, slightly smaller. PETALS: colored like the sepals, lance-linear, spirally twisted, 1–1¾ in. long. LIP: pure enamel white, purple-veined within, smooth and polished; egg-shaped, often very slender, ⅝–1 in. long.

PLACE AND TIME: DISTRIBUTION: New York to Minnesota in the north, south to New Jersey, Kentucky and Missouri. HABITAT: chiefly marl bogs,

preferably in sheltered glades and on borders of thickets. SOIL PREFERENCE: limestone; when growing in sphagnum, the roots probe down to neutral soil below. SEASON: May–June.

SPECIAL FEATURE: Lip polished white, violet-veined within.

THIS lovely little flower is quite the daintiest of all the Lady Slippers. Its small size seems only to enhance the charm of its exquisite form and purity of color. It is quite uncommon and comparatively "southern" in its range; it has never been found north of Lake Ontario, and the only stations in the Province known for it are along the shores of Lake Erie and the St. Clair River.

The plant is about the height of the Ram's Head, but stouter and less spreading in habit. As a rule the three or four leaves are furled closely about the stem, rigid, erect, sharp-pointed and strongly ribbed. This sheathing habit is protective and very noticeable in the young shoots of all our orchids; when the plant grows in stiff soil or in an exposed position it retains its wrappings even in maturity.

Small as it is, the flower is quite conspicuous. The parts of the perianth are yellow-green, freckled rather than streaked with madder-purple, the side petals perhaps a little less strongly twisted into a spiral than those of the Yellow. The cup is pure snow white on the outside, smooth and gleaming like highly polished enamel, yet soft to the touch like nothing in the world but a living flower petal. On the inside, as with the Yellows, the floor of the cup is overlaid with dotted and continuous lines of rich purple; it is translucent and flushes with a rosy warmth in the sun, the purple showing through in delicate, spreading veins. Altogether, as the photographer happily observed, in size, in pearly purity and pink shell-like glow it suggests a swallow's egg.

We never thought to see this little beauty in its native haunt; but that was one of the first fruits of our orchid partnership—to

Plate 8

WHITE LADY SLIPPER

(*Cypripedium candidum*)

Plate 9

WHITE LADY SLIPPER

(*Cypripedium candidum*)

visit the home of the White Lady Slipper in New York State, in return for a visit to the Ram's Head in Ontario. There could be no fairer exchange between north and south, for these two species are the smallest and the rarest of their kind, and have the same season of blooming to a day.

It was the first of June and at the very peak of a heat wave that we set out from Buffalo for the Bergen Swamp. Doubtless it seemed a dull road to our hosts, familiar with every inch of it, but to strangers from over the line it was full of novelty, even adding to our list of wild flowers two such notables as "Bluets" and "Moss Pink," hitherto mere names or pictured pages in a book. One thing especially we noted as a sure sign for the season of White Lady Slippers—in all the wayside orchards, masses of apple-blossoms just beginning to shed their petals. The last part of our journey was on a side road, and the big wooded swamp could be seen a great way off. Like all the best of such Eldorados it kept its treasures securely hidden behind an impassive and almost impassable exterior. The barrier was the usual one of water, but once across this girdling moat, progress was easy.

The make-up of the swamp was quite in the best tradition; a crust of hardwood, a filling of evergreen diversified by glades of moss and ferns, springs, bog-holes and squidgy footpaths; and then, in the open heart of it, not the usual deep pond, but a vast wet marl-bed, like the bottom of a shallow lake. Here and there were pools of water, white piles of broken shell, rushes and horse-tails, shrubs and matted sedge. At many points the margins of this half dried lake jutted out into the centre in great headlands and promontories of spruce, tamarac or cedar, giving the open areas the appearance of a winding tidal river at low ebb. Indeed this figure is not so fanciful as it might appear, for one of the peculiar interests of the Bergen Bog is the number of maritime plants to be found there.

No sooner had our woodland path brought us to the edge of this open space than we were motioned to take the lead. Here was

a happy thought! We were to find the new orchid for ourselves; and in another moment, sure enough—among the Shrubby Cinquefoil and close to a feathery little tamarac, we made the glad discovery. You could never wish to see a more beautiful orchid, and the heart of the swamp was full of them: there must have been thousands of blooms in and about these stretches of open marl. But the heat was terrific, and the glare of the fierce sun untempered by the slightest breeze—except of course when the camera was set for a picture! Our heads swam and we were at last forced to retreat to the spring of running water, deliciously cold, that gurgled at the edge of the woods.

While we lunched beside the spring, a refreshing breeze got up, and to it we owe the most delightful afternoon we have ever spent in a marl bog. It enabled us to cross the open and explore one of the wooded headlands beyond. Here we came upon what must be quite the richest tract of all—a kind of grassy bay, moist and verdurous, hedged in on three sides by stands of evergreen and enclosing at the heart of it a small lagoon. It appeared to be a perfect little sanctuary of wild life. White Lady Slippers were abundant along its borders, and as we roamed about in the surrounding groves and across the open, we made all kinds of happy discoveries.

A Marsh Hawk's nest with its clutch of eggs deserted, was the first object of wonder. What had happened? The eggs were all chipped open along the side instead of around the end as in hatching; probably some marauding tooth of skunk or coon had bitten them open. Then the photographer, who has a special affinity for turtles, discovered one of the rare Yellow-spotted kind. A few minutes later we had all gathered in admiration about a dainty little Salamander—terra-cotta orange with black-ringed spots of crimson—so tame that it crept contentedly about the fingers and wrist of its captor. Twice we saw the beautiful Ribbon Snake, and once the curiously marked Ring-neck. But quite the loveliest glimpse of snake-life we have had in many a day was when a

cluster of fresh green maple leaves, mysteriously lying on one of the dark fan-spread branches of yew, resolved themselves into a loosely coiled grass-snake, and flowed down to the ground before our eyes in a stream of molten jade.

Near the lagoon lay a stretch of sphagnum and heath in which Arethusas were growing; and in skirting the edges of this we discovered, half hidden by shrubberies, the entrance to an old path. Here was our chance! The signal for retreat had already sounded; this moist green track would save us a march across the open marl.

From the very threshold of it, all the way to the denser woods, were colonies of White Lady Slippers, beautiful plants in perfect condition, many of them still in bud with promise of blossoms till the middle of the month. Here was surely their proper home and haunt, embowered in rich herbage and played upon by sunlight and shadows. They seemed to be specially abundant in the open spaces where the springs lay and about the fringes of Trailing Juniper and Yew that skirted the path. At every winding turn after we left the open bog our eyes were gladdened by clusters of these lovely White Slippers, often sharing their bowers of delight with the Yellow.

The beauty of the path was impressed on us northerners all the more deeply that on it we met, at one of these entrancing corners of surprise, our first wild Azalea—the Pinkster Flower, with its big upright spindles of blossom just bursting open. And almost under its fragrant sprays stood a last little group of *Cypripedium candidum*, waiting, or so it seemed, to speed the parting guests on their homeward way. Among the many long hours we have spent in the haunts of this favorite orchid, we cannot think of any to compare with these. To speak of Bergen or to think of White Lady Slippers, is for us at once to live over again the delights of that afternoon of June 1, 1919.

IV. FRANKLIN'S LADY SLIPPER

(*Cypripedium passerinum*)

NAMES: COMMON: Franklin's Lady Slipper, Sparrow's Egg, Purple-spot White Slipper. SPECIFIC: *passerinum* (Richardson, 1823) "sparrow-like" *i. e.*, "like a house-sparrow's egg," as recorded in an Appendix to Franklin's "Narrative of a Journey to the Polar Seas," by Dr. Richardson, the Scottish surgeon-scientist who accompanied the expedition.

PLANT: 6–12 in. occasionally 15 in. high; leafy-stemmed, densely villous-pubescent. LEAVES: 2–6 in. long, obovate to lanceolate.

FLOWERS: Solitary, rarely 2, on a stiff shaggy peduncle; fragrant, rather sickly-sweet. SEPALS: *green to olive;* upper one round, convexed, ½ in. or more across; lateral pair welded into one with, usually, spreading tips, wide oval, closely appressed to under side of lip, ½ in. or less across. PETALS: pure white, delicate in texture, blunt oblong, ¾ in. long. LIP: soft white, translucent between thickened opaque veins, floor within crowded with round dots of purple; somewhat pear-shaped, ⅝–¾ in. long.

PLACE AND TIME: DISTRIBUTION: north shore of Gulf of St. Lawrence, James Bay region, Albertan Rockies to British Columbia and the Yukon. HABITAT: lake margins, borders of streams, and deep mossy woods, usually associated with coniferous trees. SOIL PREFERENCE: acid or, possibly, indifferent; in humus pockets on limestone cliffs and on low tundra adjoining limestone shore at the Mingan Islands, P. Q.; decidedly acid at Jasper Park stations. SEASON: mid-June to July.

SPECIAL FEATURE: Lip soft white without polish, purple-dotted within.

THIS rarely seen orchid was first discovered on one of Sir John Franklin's Arctic expeditions and named *passerinum* from the resemblance of its lip to a house-sparrow's egg. Its true home is in the far north and west, but more than once it has been found almost on the threshold of our allotted limits. Its recent discovery in the Province of Quebec by Brother Marie-Victorin lured us down to the Mingan Islands in 1928; and here on Ile Nue we saw masses of flowering stems—a wonderful sight—scattered over half a mile of open grassy shore. But we had first made its acquaintance three years before while camping among the Rockies.

It blooms as a rule in the latter part of June; and we did not reach Jasper till July 6th. It was a gambler's chance and we

Plate 16

FRANKLIN'S LADY SLIPPER

(*Cypripedium passerinum*)

Plate 11

FRANKLIN'S LADY SLIPPER

(*Cypripedium passerinum*)

staked our all on the first throw; we would set up camp next morning on the shore of Pyramid and scour its borders for the plant. To save time we decided to go by motor; and at the end of a hard day's planning and packing, to ease off after loading our last dunnage bag, we set out for a stroll up the Miette Valley, just stopping to charter a car for our next day's trip. That was at 8 P. M. mountain time. Two hours later we came back and cancelled the order; we had found our orchid!

Missing our way in the fir woods, we had struck east toward the Cavell road by a cross-trail. And here, while skirting the base of Whistler Mountain, at 9 P. M. and in broad daylight, we had seen the leafy green stems of a small Lady Slipper which proved to be Franklin's.

The plants were growing on a steep slope beside our trail. Above and behind them rose rough walls of cliff, overlooking the cotton-wood swamp along whose edge we were walking. The slope was dry and somewhat bare, with only a few scattered trees by way of cover. But there was abundant evidence of springs: the mountain peak was white with snow; poplar and alder flourished a few rods away; the hollows at the cliff-base were filled with sphagnum; and better still, on the sun-baked slope itself, we found Grass-of-Parnassus and some quite sturdy plants of Blunt-leaf Habenaria. Till the end of May at least, these mountain slopes must be well fed with surface springs.

The plants were very numerous—200 at least. Unfortunately they were past their prime; we could find but ten with flowers unfaded, and even these, we afterward learned, were not at their best. In size and leafage they resembled Small Yellows; but their copious pubescence was much more suggestive of Big Pink-and-Whites; these hardy Highlanders were fairly shaggy with long white hairs.

The flowers had several very interesting features in which they differed, so far as we know, from all our other Lady Slippers. The sepals were entirely leaf-like and at no time resembled petals

in either texture or color; they were grass-green in the fresh flower, olivaceous later. The upper sepal was orbicular and jutted out over the lip. The lower was ovate and cleft at the tip like that of the Yellow. In most cases the twin tips were somewhat spread, with a rounded notch between them; but in others, they were contiguous, separated only by a slit of varying depth. In a few plants, the slit extended to the very base, so that the flower appeared with a pair of separate lower sepals, elliptic, and lateral in position. This throw-back to the condition of the Ram's Head struck us as a most interesting example of reversion.

The upper petals were white, oblong, and very delicate in texture, translucent except on the veins and soon withering. The lip was pure white and soft to the eye, with nothing of the Southern White's enamel polish; the whole outside of the cup showed a network of stout raised veins with thinner translucent interspaces; the floor of the cup was thickly patined on the inside with round dots of bright purple. The overlap on the basal edges of the orifice, instead of being folded in *vertically* as it is with the other Lady Slippers, took the form of a pair of transverse flaps tucked *horizontally* in under the projecting staminode. In general outline the cup was somewhat pear-shaped with its greatest bulge at the outer end and below; to a fanciful eye it suggested a hoof, or rather—in miniature—one of those boots with which horses are shod when set to mow lawns of delicate grass.

We found this Lady Slipper at half a dozen different places, and each of the stations in turn added something of interest to our field notes. It appeared to have a distinct preference for the neighborhood of evergreens,—spruce or pine—and for springy soil where its roots could tap the underground reservoirs; three times we found it on lake margins and twice by a mountain stream. But the most engrossing feature of all was to note that its plant companions were as a rule familiar members of our eastern flora. At one spot we found it with the Tall Leafy Green and Romanzoff's Ladies' Tresses, at another with Calypso and the Broad-

leaved Twayblade. In rich springy soil along the borders of a mountain lake we found it in the company of *Habenaria dilatata*, *Zygadenus* and *Tofieldia*, Butterwort and *Selaginella selaginoides*, all plants that just a week before we had seen growing together in the Bruce Peninsula.

The most romantic of all its haunts was the heart of a coniferous forest on the slopes of Pyramid. This dark patch of spruce and Douglas fir caught and held our eye every time we looked out across the lake from our camp, and nothing would do but we must get there; if we hadn't found a sort of witch's sieve in the shape of a leaky old Peterborough canoe to take us across, it's our firm belief we would have swum. A springy strip of bog filled with Labrador Tea and Philadelphia Lilies led obliquely up the slope to the edge of our coveted grove; and here, among giant horsetails, we found a great colony of Franklin's Lady Slippers, lodged for the most part in moss-wells along with the Small Round-leaf Orchis (*Orchis rotundifolia*), both plants in full bloom. At one spot in a cushion of sphagnum were six almost perfect flowers of this Northern White Lady Slipper companioned with Twinflowers, Heart-leaved Twayblade, Blunt-leaf Habenaria, and Tall Leafy Green—a lovely bit of orchid-cover!

At the close of our trip we brought a pailful of these Lady Slippers home with us and planted them out as suitably as we knew how. One of the clumps we found ideal cover for—a perfect replica of its home in the Rockies—an upland lake ringed round with granite cliffs and groves of evergreen. It took us just four times as long to reach the plants in their new home as it had taken to find them in their old; for, after a full hour's motor trip, came a two-mile paddle up a lee-shore and a rough bush trail on the top of that.

Great was the excitement next June, when one of our "observation" clumps revealed a bud among the shoots of leafy green; and greater still, when a trip to Fairy Lake discovered two open flowers! At the drop of the hat, the photographer packed his kit

and motored over from Buffalo. It proved one of the most ticklish jobs he had ever undertaken—small low-set blossoms of unrelieved white in a dense thicket of evergreen. But he was more than equal to the occasion, and three fine field portraits were added to our gallery.

If you study these closely, you will find some features recorded which belong to the young flower only. The petals are more firm and fleshy than any we saw at Jasper; and the forepart of the lip is perceptibly "stemmed," like the prow of a fairy shallop. For us to look at these pictures is pure crystal-gazing. At once we retrace the long trail to Fairy Lake. Yet again the night-hawk, surprised on her eggs, spread-eagles and flutters on the ground before us. Nestling under the pines we see our little clump of Franklin's Lady Slipper close by the lapping water of the rocky shore. But is this Fairy Lake—with all those snow-clad peaks against the sky? And behold! we are back in the Rockies; now beside the mountain lake where we dug our plants, and now safe-landed from our witch's sieve, standing under the Douglas firs at gaze before those glorious moss-wells of flowering orchids.

V. QUEEN LADY SLIPPER

(*Cypripedium reginæ*)

NAMES: COMMON: Queen Lady Slipper, Showy Slipper, White-wing Moccasin, Big Pink-and-White, Purple Blush. SPECIFIC: *reginæ* (Walter, 1788), "queen's" *i. e.*, "Venus the Queen's Slipper."

PLANT: 1–3 ft. high, leafy-stemmed, stout, hirsute. LEAVES: strongly ribbed and pubescent, ovate to elliptic, 3–7 in. long.

FLOWERS: 1–2, occasionally 3–4; short-stalked in axils of erect leaf bracts. SEPALS: green to creamy in bud, *pure soft white* in open flower; wide ovate to round; upper one, 1¼–1½ in. long, nearly as wide; lower pair, entirely welded into one, as long as upper sepal but somewhat narrower. PETALS: pure soft white, lance-ovate, about 1½ in. long. LIP: outside, white to pale mauve be-

low, flushed with rose-purple on face, ribbed with sunken striæ of white; floor within, decorated with white-margined veins of green and double spotted lines of purple; almost spherical, much inflated, about 1½ in. long.

PLACE AND TIME: DISTRIBUTION: Newfoundland–Manitoba in north, south to Georgia and Missouri. HABITAT: swamps and wet mossy woods. SOIL PREFERENCE: neutral, very luxuriant in limestone regions. SEASON: June–July.

SPECIAL FEATURE: Lip white to mauve, rosy-flushed on face.

THIS magnificent flower is incomparably "queen" of our Lady Slippers. Its popular name of "Showy" translates the old book name, *spectabile*. It is better called the Big Pink-and-White; for in it Nature has perfected the beauty of two equally conspicuous but sharply contrasted colors. The sepals, if not the petals, of all our other Lady Slippers are neutral in color and inconspicuous; but in this the glowing rose purple of the globular lip is thrown into relief by a dazzling corona of snowy white and to heighten the effect the parts of the perianth are greatly enlarged.

The plant has a stout succulent stem ranging from less than a foot to about three feet in height, and adorned with alternate broad-oval pointed leaves, large, spreading, and rough like the stem with hair. The flower-stalk is fairly stout, and the blossom that surmounts it has an erect leaf-like bract behind it. In the larger plants the flower-stalk is divided into two branchlets, occasionally three or even four, bearing each its bloom. And a wonderful bloom it is: at the sides, outstretched like wings, the two wide-oblong petals; poised above and below, like a pair of rounded shells, the big concave discs of the sepals; all four a snow-white foil to the rose-purple orb at their centre.

The ground color of the lip is white, but overlaid with purple both within and without. Sometimes the whole cup is quite pale, but as a rule it is flushed with a rich wine-red on the face, fading down the sides through delicate mauve to white. It has somewhat of a striped appearance, the walls being ribbed with quartering lines that are whiter than the rest of the surface. The staminode

is usually blotched with yellow; probably an insect-lure to draw the bee on foraging wing to where the golden pollen seems to lie clotted at the heart of the rosy bloom.

This wonderful flower is the crowning glory of our northern bogs. Even tropical orchids with all their gorgeous coloring cannot to our mind compare with it, for they lack their terrestrial sister's dower of rich green foliage. It is thirty-three years since we first came face to face with this queen of the Lady Slippers, but the wonder of it never wanes; to miss its flowering season seems almost to lose the summer out of the year.

It is the most moisture-loving of all our Cypripediums. Glorying in the wettest of swamps, it taps with its roots the bog holes and springs that lie beneath the mossy surface, while its great leaves reach up and out like hands to catch the rain and channel it down to the stem; both leaves and stem when broken will often drip with water. Like the Yellow Lady Slipper, it loves to bask in the bright light and when growing in a thicket will usually stretch up to its very tallest, in order to gain a "place in the sun." In many of our wetter and more inaccessible bogs it is to be found in great profusion—thousands of plants—and blooming very freely at any time between the last week of June and the middle of July.

Its choice of rich juicy cover makes this Lady Slipper a capital guide to other orchids. Our first "pocket" of Big Pink-and-Whites, a typical northern muskeg discovered away back in tenderfoot days, held so many other good things that a happy thought struck us: we would follow up all possible clues to this orchid and see where they led. The results were quite surprising. Hundreds of country people—children, farmers and trappers—who hardly knew an orchid by name, could put us on to the track of *Cypripedium reginæ*. Many of our best finds both of bogs and of rare orchids have been made in this way: all three stations for the Prairie White Fringed (*H. leucophæa*), our first Ram's Heads, Arethusa, and the Small Round-leaf Orchis. We now follow the lead of the Big Pink-and-White with all the confidence of the "dowser" in his divining rod of hazel.

Plate 12

QUEEN LADY SLIPPER

(*Cypripedium reginæ*)

Plate 13

QUEEN LADY SLIPPER

(Cypripedium regina)

For two of us this Lady Slipper always brings to mind that treasure-house of orchids, the big bog at Bonaparte Lake on the edge of the Adirondacks. It was the fame of its fishing that first drew us to this place, and on the very morning after our arrival we went exploring down through the woods till we came to a glorious spring; venturing out a little way into the sphagnum for pure fun of the thing, we suddenly came on great clumps of this royal flower, the Big Pink-and-White Lady Slipper, filling every open space about us. Forgotten the fishing we had come for, forgotten the prudent rubbers we had donned and now buried in the swamp with stamps of sheer excitement; forgotten everything but that here were orchids; never had we even dreamed of them in such splendor of profusion. And venturing further and further into the swamp, now in great mounds of sphagnum, now in deep cedar thickets, we found first one and then another of this wonderful family of wild flowers: the Little Club-spur (*H. clavellata*) and the Tall Leafy Green (*H. hyperborea*); Early Coral Root and Heart-leaved Twayblade; great stretches of Pink Moccasin, the Small Yellow Lady Slipper, and even the rare little Ram's Head; finally, out in the open, where the railroad intersects the swamp, that exotic little gem, Arethusa. Our cup was indeed filled to overflowing, for seven new orchids were added to our then short list.

In our northern hunting-grounds, hardly a season passes without our finding big beds of these orchids, transforming some corner of cold wet spruce bog or tamarac swamp into a tropical garden. Perhaps the most beautiful of these finds was the one we made two seasons ago in a little-frequented piece of wooded bog. While prospecting along one of its main logging roads we happened by good luck to be diverted into a side track.

It was a narrow path, long disused, carpeted with deep soft moss and crowded in on both sides by the foliage of the trees. The growth was mostly spruce and cedar, with some hemlock, pine and tamarac; here and there some windfalls of balsam had made

a little clearing beside the path; everywhere in the moss and under the evergreens were trailing vines of Twin-flower, Creeping Snowberry, and a profusion of One-flowered Pyrola. The sun's rays filtering down through the thin fringes of foliage overhead lit the long vista of this woodland path with a magical half-light. All down it Yellow Lady Slippers were abundant. At the far end we found our way blocked by a thicket of Osmunda; but we had no sooner forced a passage through this than we found ourselves in a little sun-bathed clearing with more Big Pink-and-Whites ranged along its nearer margin than we ever remember seeing in so small a space.

The clearing was very boggy and rich, full of sedgy pools, sphagnum mounds, Shrubby Cinquefoil, and Heaths. A circuit of the surrounding thickets yielded fifteen different orchids, including White Adder's Mouth and Heart-leaved Twayblade. Out in the open, as usual, the more conspicuous kinds were to be seen—gleaming white spikes of *Habenaria dilatata*, Grass Pink, Arethusa, and Rose Pogonia. But for sheer splendor and luxuriance nothing could touch the Big Pink-and-Whites. The blossoms ranged from the richest wine-red to snow-white, with that velvety "softness" peculiar to petals that absorb the light instead of reflecting it. Several of the plants by actual measurement exceeded three feet in height; and one—a local record—bore three flowers.

They were gathered for the most part into four colonies, each occupying a niche, as it were, in the encircling wall of woods. The largest colony numbered over two hundred blooms; the plants were growing beside a big pool of spring water that had welled up at the base of an uprooted spruce. Standing at the mouth of a dark alcove of evergreens, in the full light of the westering sun, they made a wonderful picture—great poised blossoms of rose-purple and white uplifted like standards above the mass of leafy green stems.

VI. STEMLESS LADY SLIPPER

(*Cypripedium acaule*)

NAMES: COMMON: Stemless Lady Slipper, Two-leaved Slipper, Pink Moccasin, Rose-vein Moccasin, Hare's Lip, Squirrel Shoes, Noah's Ark, Whip-poor-will Shoe. SPECIFIC: *acaule* (Aiton, 1789), "stemless," the foliage and naked flowering scape being thrust up from a short underground stem.

PLANT: STEM: subterranean, short. LEAVES: 2, silvery beneath, rich green and sticky pubescent above, basal, nearly opposite, oval, 5–9 in. long; floral bract at summit of scape, lanceolate, keeled, arched forward over upper sepal. SCAPE: stout, pubescent, 6–18 in. high.

FLOWERS: Solitary, drooping, large. SEPALS: yellowish green, finely striated with brown purple, lanceolate to lance-ovate; upper one, nearly 2 in. long and over ½ in. wide; lower pair, entirely welded into one, shorter and wider. PETALS: greenish brown with thin lengthwise lines of pinkish, sometimes wavy twisted, lanceolate, unequally dilated at base, lower side forming a large lobe. LIP: pale pink warming to red on the face and netted with rosy veins; 2¼ in. long, obovate, drooping, open down the front and with the unwelded edges folded in.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England in the east to North Carolina, west to Manitoba, the Mississippi Valley and Tennessee. HABITAT: wet sphagnum swamps and dry rocky woods and slopes; usually under evergreens, pine, hemlock, cedar. SOIL PREFERENCE: strongly acid-loving, rare in limestone regions and only where leaching has occurred or acid humus, sphagnum, etc., has overlain the neutral soil. SEASON: May to June or early July.

SPECIAL FEATURE: Cup fissured the full length of its upper side.

THE large size and rich color of the Pink Moccasin or Stemless Lady Slipper give it conspicuous beauty, and this is greatly enhanced by the charm of its surroundings. No matter how common it may be, the first fresh sight of it in May or early June is always something of an event; you feel you had forgotten just how large and bright and stately a flower it was. Perhaps you have just entered some shadowy grove of evergreens, and there suddenly you come on a little group of them near the base of an old hemlock, their big drooping heads flushed with a stray sunbeam, or drowsing in the twilight. Amid such scenes no flower could ever "fade into the light of common day."

The plant consists of a short underground stem, from which spring a pair of large oval leaves, and between them a tall stout naked stalk surmounted by the flower. The leaves are rather thick and strongly ribbed, silvery beneath, shining dark green above and somewhat sticky with short hair; in the young plant they form a sheathing vase to protect the blossom, but later they acquire a more lax and spreading habit. The scape is coarse-fibred and stiff, sometimes crooked and a little ungainly in appearance. The sepals and side petals of the flower are greenish brown in color and somewhat narrow.

The lip or pouch is very large, far the longest of all our "Lady-slippers," and droops almost vertically from the point of attachment. It is very strangely formed, cleft down the middle like a hare's lip the full length of the upper side, instead of being moulded into a perfect cup. In fashioning this little shoe the sides are curled up from the sole in the usual way, but when drawn over to meet above the instep their edges, instead of being welded together, are softly folded in, leaving two steep ridges that run from top to toe with a deep cleft between them. The color is a very delicate pink, overlaid with a network of rich rose-red veins.

The Pink Moccasin is rather different in its habit from the other Lady Slippers; it likes plenty of elbow room, and instead of being massed in dense clumps prefers to spread loosely over wide areas; it is a brave sight and by no means uncommon, to see whole acres of rich bog-land sown broadcast with these beautiful rosy-glowing blooms. It makes its home almost everywhere, from damp shady thickets in the depth of swamps to dry rocky hill-sides and cliffs. In New York State it is a familiar sight wherever it can find suitable cover; and far north the tourist in Temagami or New Ontario will find it on all sides, growing under pines, on granite slopes, in dry reindeer moss, and in the very heart of the forest. It is particularly partial to the shade of evergreens and multiplies often into large colonies about the scattered shrubberies of swamp underbrush; such colonies are usually transient,

Plate 14

STEMLESS LADY SLIPPER

(*Cypripedium acaule*)

Plate 15

STEMLESS LADY SLIPPER

(*Cypripedium acaule*)

for the shrubs, at first a kindly protection, sooner or later smother the Moccasins. In the same region and even in the same neighborhood it frequently occurs in the most diverse situations, now growing rankly in the sphagnum beds of some deep shady bog, or again crowding the upper levels of a wooded hillside. One such place where we love to go each season at flowering time, the heavily wooded slope of a great broad valley, seems, strangely enough, to have a well-defined stratum at which we can always depend on seeing these Moccasins; and just as infallibly above or below this level they disappear completely.

It happens that we in Ontario have never lived where the Pink Moccasin was common. So last season on the strength of a rumor we visited one of the islands in Stoney Lake. The shore of this lake is of limestone formation, but its islands are granite. This particular island is built of solid rock from the water's edge to the highest point of the interior, perhaps two hundred feet up; it has no high precipices, but many enormous masses of gray granite with somewhat smooth weathered surface, either standing in level platforms and shelves, or tilted into steep slopes and broken with gully and crag.

The whole surface of the island is lightly wooded, with oak, pine and hemlock, besides maple, poplar, birch and cherry. We paid it two visits between the end of May and early June, both days of bright sunshine, and found it a scene of memorable beauty. A broad strip of glade running up the centre of the island was crowded with pin-cherry in full bloom and alive with the murmur of bees; near its edges we found some clumps of a very beautiful flower we had seen only once before—the Golden Corydalis, its leaves finely cut and covered with a gray bloom like those of Squirrel Corn; about the rocks were quantities of Bearberry in the very "pink" of bloom, Pale Corydalis, Wild Columbine, Early Saxifrage, and a low-growing thornless Dog-rose with large and very fragrant blossoms.

And all about the island, almost from the water's edge, up the

rocky slopes to the very roof of it, especially where it was carpeted with gray and green moss, both in the open beyond the shadow of the pines, and in the hemlock groves, ranging from a few inches in height to nearly two feet, stood Pink Moccasins. We had never seen a more perfect setting for the flower, particularly in the shade of the hemlocks, where as many as twenty or thirty blooms might be counted in a single small grove, looking like little Chinese lanterns hung over the path to light one's footsteps in the dusk.

Among all the haunts of the Pink Moccasin known to us, the one we like best to associate it with has the peculiar interest of harboring five different kinds of Lady Slipper within the space of a few rods.

This favored spot is beside a little "mud lake," which the four of us visited some years ago. It is entirely hidden on all sides by woods, at the lower end by a dense belt of tall tapering cedars—"right thrifty trees," as their owner proudly described them. At the water's edge is a fringe of Sweet Gale, Cassandra, and Royal Fern; back of that, a narrow strip of typical sphagnum bog, and then the cedars. The floor beneath the cedars is moderately damp, clean, smooth, and deeply shaded. If you are interested in ferns, those most beautiful of "foliage plants," a delightful surprise awaits you in the presence of that tiny rarity, the Little Grape Fern; but an even more remarkable feature is the Large Round-leaved Orchid which grows in great abundance here, the whole area being studded with scores upon scores of its big flat "twayblades."

The strip of bogland near the water's edge, rich, moist, and open, seems specially created for Lady Slippers; and there they are, clump after clump, as far as you can see along this lower margin of the lake—Small Yellow and Large Yellow, Ram's Head, and Showy. True to type, the Small Yellow has made its home in the very moistest nooks of this orchid sanctuary and will be found nowhere else; but all the others—even the Big

Pink-and-Whites—have spread into the cedar belt; the Large Yellow and the Ram's Head appear to roam over its whole area unchecked; they have even established themselves on a small promontory of dryer ground that runs down from the hardwoods; and here under hemlock and white pine, they are actually on nodding terms with a beautiful little colony of Pink Moccasins; the flowers vary remarkably in coloring; nowhere else can we remember to have seen "slippers" of quite so rich a red as we find them here, and last season we came upon one that was pure white, looking strangely beautiful in the midst of her rosy sisters.

If you have the good luck, as we had, to visit this spot in an exceptional season, when the two ends of June meet together in a riot of summer flowers, you will enjoy a very rare sight: Yellow Lady Slippers both Small and Large, Big Pink-and-Whites, Ram's Heads, and Rose-veined Moccasins, all blossoming together in a single little corner of native woodland.

II

TRIBE OF THE EYEBROW ORCHID

	GENUS
II. Orchis	*Orchis*
III. Rein-orchid	*Habenaria*

II

ORCHIS (*ORCHIS*)

I. SMALL ROUND-LEAF ORCHIS

(*Orchis rotundifolia*)

NAMES: COMMON: Small Round-leaf Orchis, Little Round-leaf, One-leaf Orchis, Spotted Kirtle-pink. GENERIC: *Orchis* (Linnæus), named from the two biennial tubers present among the roots of most European species. SPECIFIC: *rotundifolia* (Banks ex Pursh, 1814), "round-leaf."

PLANT: SCAPE: slender, naked, 6–10 in. high. LEAF: solitary, basal, dull green, smooth, round to oval, 1½–3 in. long.

FLOWERS: 3–12 or 14, bracted, in a loose spreading spike. SEPALS: pale pinkish mauve to white ¼–⅓ in. long; lateral pair, lance-ovate, spreading; upper one, wide-ovate, shorter, forming a hood with the lateral petals. PETALS: pale whitish pink to mauve, smaller and narrower than the sepals. LIP: white spotted with mauve or purple: irregularly oblong spatulate, armed at base with a pair of oblong lobes, dilated and notched at apex, ¼–⅓ in. long; spur, moderately stout, slightly curved, ⅓ in. long.

PLACE AND TIME: DISTRIBUTION: Newfoundland and Quebec in Canada to British Columbia and the Yukon; Northern New England west to Minnesota and Montana. HABITAT: moist mossy hollows in bogs under cover of cedar, spruce and tamarac. SOIL PREFERENCE: neutral, but tolerant of some acidity; found in spruce forests among the Rockies and in sphagnum; frequent in limestone areas of Ontario, and very abundant on limestome floors in the Mingans, P. Q. SEASON: June–early July.

SPECIAL FEATURE: Lip hastate at base, dilated bi-lobed at apex.

THE Small Round-leaf Orchis is heart and soul with the North. It is surely a remarkable thing how many wild flowers of the most delicate beauty prefer a cold climate. This is true of nearly all our Lady Slippers; and where will you find a lovelier trio than *Arethusa*, *Calypso*, and *Orchis rotundifolia*, all three daughters of Boreas?

Except the Small Whorled Pogonia there is probably no rarer

orchid in all our North Eastern States. We know but two stations where it may be found—one at Crystal Bog near Caribou, Me., the other in Northern Vermont. Long ago it was on record at more than one spot in New York State, and though no one has had the luck to discover it there of recent years, in our opinion *it is still quite a possible find*. Flower-lovers in Canada are much to be envied. They may come across its graceful spray of blossoms almost anywhere. We ourselves have seen it many times, occasionally even in great abundance.

It is a small plant of simple construction, having a single leaf close to the ground and a naked scape surmounted by a loose spike of few flowers. The wide roundish-oval leaf, rather thick, smooth, and dull green, rises from a sheathing base and then flattens out horizontally above. The flower-stalk, some six or eight inches in height, is bare of bracts, smooth, slender, and graceful; at the top is a loose spike of three to ten flowers. The upper sepal and petals together form a little hood; the side sepals are spreading and free; all five pinkish or pale mauve. The lip is quite large, spurred, and irregularly oblong, being conspicuously lobed at the base, dilated and notched at the tip; in color it is white or pale rose, very beautifully decorated with spots of rich purple.

With its scallop shell of foliage and wand-borne spray of blossoms so delicately colored and of such a curious shape, it has to our mind a quite peculiar charm. If all its dainty grace could be packed in a single phrase, "exquisite" is the word that comes to mind.

We first found it in the heart of a huge swamp of Eastern Ontario, where it grew about shallow basins and mossy depressions under the tamaracs. It loves the very richest and wettest of bog cover, as a rule fairly open situations on the edge of a thicket or in some sedgy tract very lightly overgrown with trees. Its fondness for spongy hollows is quite remarkable—thoroughly saturated moss-wells, pockets, and troughs, can nearly always be relied on for a colony of these graceful little spikes of orchid

blossom. It is a rare plant and loves rare companions. We have already spoken of finding it with the Ram's Head and Franklin's Lady Slipper. More than once we have seen it with Arethusa and the Heart-leaved Twayblade. Last spring, to cap the climax, we found it alongside a much-prized colony of Calypso: two dainty budding spikes in a wet mossy spruce glade.

For several seasons after settling in Central Ontario, we were unable to find any trace of the plant. But no sooner had we discovered a single station for it than we found six or seven more in rapid succession. In one big bog the colonies were very abundant, scattered over two or three acres of ground. At one spot we came upon a spongy tray lined with flannelly moss, in which more than forty were growing together as in a snug little garden bed. At another, we counted a dozen spikes on the top of a mossy log that lay half submerged in a pool beneath cedars. They had a most artistic appearance, being grouped quite carelessly, of different heights, and in all stages of blossoming, from bud to full-blown flower.

The first of these recent discoveries was made in June 1918, and the following Christmas brought a curious coincidence—two requests by the same mail to help some friends of the writer in their search for the Small Round-leaf Orchis. The letters had been written quite independently but, singularly enough, both trails led to one and the same house in Buffalo. By the following May "we four" had entered into an orchid-hunting partnership rich in undreamed-of pleasures and surprises.

As ill luck would have it when our new-found friends arrived with the camera to get their first picture, the plants were only in bud still. Here was a dilemma! But the photographer had been taking no chances and immediately drew a trump card from his sleeve in the shape of a pencil sketch, indicating the exact spot in the township of Manvers where a Rochester correspondent had found this orchid some thirty years before. Reference to an old county atlas brought startling results. By all appearance Sam

Plate 16

SMALL ROUND-LEAF ORCHIS

(*Orchis rotundifolia*)

Plate 17

SMALL ROUND-LEAF ORCHIS

(*Orchis rotundifolia*)

Hill's farm was just about the hub of the universe: east and west it lay between Pontypool (Wales) and Cadmus (Greece); north and south, between Lotus (Egypt) and Tyrone (Ireland); to get to it we must head either west for Cæsarea (Samaria) or south for Leskard (Cornwall); the only place marked on the road that ran past it was Burton (England). So off we set for the village of Burton.

It proved as hard to find as the Dark Tower of Childe Roland's quest. At first no one had ever heard of it; then every one seemed determined we shouldn't get there. It will be many a day before we forget the look on the lady's face at Bethany when she found that the respectable-seeming motorists who had stopped at her gate were bound for Burton; or the action of the "ancient" in full Sabbath regalia of plug hat, shirt sleeves, and cutty clay, seated in state on his little front porch at Yelverton. How affably he rose to greet us! Every town and city along those four cross-roads was ours for the asking; but no sooner had we uttered the ill-omened word "Burton" than he stopped abruptly and, waving an arm haughtily in the air to signify that the interview was now closed, replaced the pipe in his mouth, the plug hat on his head, and himself in the rocker, while we slunk sheepishly off to our car. And then, when at last we came to the corner where the map marked a village, behold—one solitary tumble-down shack! Just then a dog barked, a man emerged, and to our shouted question came reply: "Burton? Right here! This is Burton." No wonder it was taboo!

But to us it was the home of *Orchis rotundifolia*, and we inquired eagerly where Sam Hill lived. "Too bad! Sam Hill was dead; surely we knew that! He had been dead a long time. The best thing we could do was to go east again and visit his grandson back to Ballyduff." It took several minutes to explain that we didn't really care where Sam Hill and all his tribe were gone so long as they hadn't taken the farm away with them. This was the last obstacle; it was like entering some land of witchcraft;

from Burton onward every gate flew open at our touch. Sam Hill's successor himself pointed out the picturesque pine bluff in the background that overlooked our magic tract—a small densely wooded swamp, in whose depths we caught the gurgle of a trout stream.

"To right of line fence, opposite sand dunes, near edge of swamp," read the photographer from his little pocket plan; and at once the pack spread out, quartering the cover. In five minutes one of us was heard giving tongue; in ten minutes two more took up the cry. *Orchis rotundifolia* was quite abundant, the second station particularly fine, in moist mossy hollows about a patch of small tamaracs, screened from the wind and basking in sunlight, so that the plants were well-advanced and already in blossom.

The swamp was quite small and could be searched over in half an hour; but it was remarkably rich in all kinds of bog plants, and everything conspired to make the day one of the happiest and most vivid memories in all our orchid-hunting experience. At the very outset we found the place a perfect Paradise of Lady Slippers. Then, while the pictures were being taken, one of us discovered, in the loose hummocks of sphagnum under some spruce, a score or more of that tiniest of orchids *Listera cordata*, a rare prize for this district. Next, as we emerged from the swamp through a fringe of pines, the photographer made his first find of Striped Coral Root (*Corallorrhiza striata*), a magnificent clump of this great gaudy saprophyte in full bloom. And finally, at the edge of the pines, growing in sand washed down by the rains, we stumbled on a belated crop of big cream-colored morels; whereon we regaled ourselves at supper that night, to celebrate one of the most satisfying days in the season, or indeed in many seasons.

II. SHOWY ORCHIS

(*Orchis spectabilis*)

NAMES: COMMON: Showy Orchis, Two-leaved Orchis, Purple-hooded Orchis, Kirtle-pink. SPECIFIC: *spectabilis* (Linnæus, 1753), "showy."

PLANT: SCAPE: 4–10 in. high, stout, 4–5-angled, naked, 2-leaved at base. LEAVES: smooth, shining, ovate, 3–8 in. long.

FLOWERS: 3–6 or 8 in a loose spike, about 1 in. in length, long-bracted. SEPALS: lance-ovate, pink to mauve; all three united with the petals into a hood. PETALS: like the sepals but smaller. LIP: white, tongue-shaped, dilated; spur, stout, clavellate, ⅔ in. long.

PLACE AND TIME: DISTRIBUTION: New Brunswick to Ontario; New England to west of Mississippi Valley; south to Missouri, Tennessee and Georgia. HABITAT: rich woods, mostly deciduous, occasionally hemlock groves. SOIL PREFERENCE: neutral, tolerant of a little acidity. SEASON: May–June.

SPECIAL FEATURE: Lip tongue-shaped.

THE Showy Orchis is a much more familiar sight than its little sister of the north. It is to be found in almost every district throughout its wide range. And so far from hiding like a shy recluse in the depths of some inaccessible bog, it has a most neighborly way of appearing in frequented places—beech woods and maple groves where the children gather Mayflowers.

The plant is decidedly fleshy and hugs the ground close. At the base appear two large broad-oval leaves, 3–6 in. long, thick, smooth, glossy, and somewhat spreading. From between them rises a stout fleshy scape, quadrate or sometimes five-angled, and rarely exceeding 6 or 7 inches in height—often hardly tall enough to swing the blossoms clear. On its upper half are borne the few, fairly large flowers, each supported by a long leaf-like bract. The flower is ringent or gaping; the upper half consisting of the three sepals and two side petals folded together into a little helmet or over-arching hood of soft mauve; the lower half—the lip, large, snow-white in color, and shaped like a tongue, dilated at the sides and pointing down, the base extended into a long stout nectary or spur.

The blending of white and delicate mauve, the latter an unusual color among our orchids, with the lush green of stem and glistening leaves is most pleasing; and the flowers are large enough and few enough to stand out as individuals. In the Rein-orchids this effect is often lost in the community life of the spike. The flowering stalk of the Showy Orchis is often so short that the spike of big-lipped blossoms is apt to look clumsy and out of proportion, especially when seen from above; and the more crowded the flowers are among the large over-lapping bracts, the more top-heavy the spike appears. In many cases the alternate flowers are massed at one side or huddled toward the apex, so that the sense of balance is disturbed.

In nearly every colony, however, there will be found a few plants, somewhat taller and with blossoms more distant and evenly distributed, in which balance and proportion are completely satisfying. On such plants the eye rests with peculiar pleasure, and one feels somehow that here is the true type of the genus—in the New World at least: a spike, to be sure; but not crowded or stiff; a few flowers set loosely, almost carelessly, about a common axis, and spreading as in a spray. It thus links the single-flowered kinds with the dense-racemed; and furnished as it is with the characteristic nectary, it well deserves the name *Orchis*, type genus of the whole orchid family.

It loves the well-drained rich vegetable mould of old woodlands. While occasional in moist hemlock groves, it is much more commonly found under maple and beech, where it thrusts up its thick fleshy sprout among the fallen leaves. It flowers very early, following hard on the heels of the Adder's Tongues and Trilliums, its close neighbors and fore-runners in the pageant of spring. Little glades and open spaces of old unpastured sugar-bushes, where the shade is not too dense nor the soil too dry, are likely places for it; indeed, almost any rich wood that admits the daylight generously and is unspoiled by lumbering or by cattle should yield scattered colonies. Companions in some parts of its

Plate 18

SHOWY ORCHIS

(*Orchis spectabilis*)

Plate 13

SHOWY ORCHIS

(*Orchis spectabilis*)

range are frequently the Large Yellow Lady Slipper, Hooker's, and occasionally the Bracted.

This orchid is by no means common in Central Ontario, and we have always counted ourselves lucky to find a good station for it in the first try-out we made in the neighborhood of Peterborough. The plants were growing at the foot of a slope in rather sandy alluvial deposit brought down by melting snows from the plateau above. This was an entirely new sort of habitat to us at the time, but it proved characteristic; several of the most abundant and flourishing colonies we know of are similarly situated.

The wooded ravine where we made this first find was fairly open and delightfully rich in spring flowers—Hepaticas, Dog-tooth Violets, Bell-flowers, and Trilliums. The slopes that flanked it had a great outcropping of dark cone-shaped morels; and it was while harvesting these that we first made our way to the plateau above. Here, close beside a big bed of Wood Betony, we discovered a clump of Yellow Lady Slippers and—unforgetable sight—our very first spikes of Striped Coral Root. As if that were not enough for one day, we had no sooner stepped to the adjoining fence to mark the station than we found ourselves staring at a pair of young fox cubs at play on the edge of a wheat field.

They were only a few paces off, but up wind, and our little screen of Balm-of-Gileads never betrayed us. When we first spied them, they were in the midst of a rough-and-tumble, sparring with their fore-paws and rolling one another over on the ground with open mouths and lolling tongues. Presently tiring of this, they started a game of hide-and-seek. One went rollicking down a slope, mischief in every movement, and hid behind a boulder. Then the other came sauntering innocently past the ambush; a rush, and he was bowled over in the grass. It was all just as human as children or puppies.

How we wish we could have watched the game through to its close; but just at that moment we were startled by a harsh barking; a big red fox raced out from the wood into the wheat-

field in front of us, and the cubs as if by magic were swallowed into the ground.

Among the many memories all four of us have of meeting the Showy Orchis, one day stands out with special clearness: a bright warm day in early June, when we bade good-bye reluctantly to some beautiful groups of the rare Small Round-leaf Orchis, and climbed out of the sultry swamp to lunch at the car. It was parked at the top of a slope beside a little wood; a very pretty wood at any time, but specially inviting on a hot day of early summer. The foliage was still young and tender, of varied shades—not yet ripened into uniform green; maple, basswood, beech, blending with dark pine; about the edges, hawthorn and choke-cherry, milk-white with a profusion of bloom.

Through the wood ran a little footpath, threading its way along near the border where the trees were less crowded; and to our great delight, beside this path, at five or six different places, we found colonies of Showy Orchis, still in the perfection of their bloom. At two places they were particularly attractive: near the fence-corner beside some scattered glacial boulders, and further in by a group of white pines. The knowledge, as we looked down on them, that just over our shoulders, a single field away, stood scores of the Small Round-leaf Orchis, served to impress the scene indelibly on our mind.

Probably none but a botanist can appreciate the peculiar satisfaction we experienced in finding these two plants, so very closely related and yet so different, growing within a stone's throw of each other and so easily compared; one water-loving and flourishing in wet moss surrounded by typical bog flora, the other well up the hill, high and dry, in open hardwoods; sole members almost in the New World, of the group that more than two thousand years ago won for their tribe the name of Orchid.

III

REIN-ORCHID (*HABENARIA*)

I. TUBERCLED ORCHID

(*Habenaria flava*)

NAMES: Common: Tubercled Rein-orchid, Tubercled Orchid, Gypsy-spike. Generic: *Habenaria* (Willdenow, circ. 1805), "strap" or "rein"-orchid, said to indicate the shape of the spur in the type species, but quite appropriate to some of our Rein-orchids with lanceolate lip—like the tongue of a strap; Specific: *flava* (Linnæus, 1753), "yellow," referring to the yellow-green lip.

PLANT: Stem: fairly stout, leafy, 1–2 ft. high; lowest leaves alone fully developed, abruptly reduced to bracts above. Leaves: elliptic to lanceolate, 4–12 in. long; floral bracts exceeding ovaries.

FLOWERS: Forming a crowded 2–6 in. spike; yellow-green, small, numerous. Sepals: greenish-yellow, ovate to roundish, ¼ in. long, lateral pair spreading. Petals: similar, but greener and less wide. Lip: yellowish-white, ¼–⅓ in. long; irregularly broad-oblong; hastately lobed at base; forward of this, tubercled on median line and deflected; apex truncate; spur slender, 1/6–¼ in. long.

PLACE AND TIME: Distribution: Atlantic Provinces and New England south to Florida, west to Mississippi Valley, Minnesota to Texas. Habitat: wet grassy places and moist thickets, especially low river-banks and alluvial deposit. Soil Preference: apparently indifferent; northern plant sometimes abundant on limestone river-banks, southern form *H. scutellata* prefers subacid. Season: June–July.

SPECIAL FEATURE: Lip two-lobed at base, tubercled above.

The Tubercled, like the Bracted, is quite inconspicuous, one of the many homely kinds our friends are apt to scorn: "That, an orchid!" is the common cry. None the less we four have found it a most intriguing creature, a will-o'-the-wisp that first and last has led us just about as pretty a dance of miles and seasons as any of the world's most famous beauties—

Calypso, Arethusa, or "the face that launched a thousand ships."

It is rather curious in its distribution, being found all the way to the Gulf States from Cumberland House in the Hudson Bay region. South of the Great Lakes it is said to be "common," actually replacing the Tall Leafy Green (*Habenaria hyperborea*). Our own private label for it, in the districts we know best, is "infrequent and local." But undoubtedly it must often be overlooked; for besides being inconspicuous, it is fastidious to a degree and has a quite peculiar habitat.

In general the plant stands from 10 to 18 inches in height. It is leafy-stemmed, but only a few of the leaves are fully developed; occasionally, as in *H. bracteata*, one of the two lowest is very large, almost monstrous. It is a smaller plant than *H. hyperborea* and the spike of flowers is shorter and more loosely spreading. The flowers are paler in color than those of *H. bracteata* and distinctly tinged with yellow (*flava*). The lip is short, broad-oblong in shape and truncate at the tip; at the base it is hastate with a pair of projecting lobes, and—something quite unique—on the face of it stands a blunt little cone-shaped nipple. No other of our Rein-orchids has this peculiar feature, and it renders identification both easy and sure.

Just what purpose is served by this curious little hump is still, we suspect, a matter of conjecture. At any rate the currently accepted reading of the riddle hardly squares with the facts of field observation. Under the impression that the tubercle stood *erect* and *at the very mouth of the nectary*, Darwin concluded that it was there to prevent direct approach on the part of the thirsty insect coming to sip at the flower. In point of fact the tubercle is set quite far forward on the lip and juts out like a snout almost horizontally, the part beyond it being sharply deflected. It might serve equally well to support some small climbing or settling bee as to parry the thrust of a probing butterfly. Just how the plan works and with what insects, we have not been able to discover. But the means by which this orchid draws its

Plate 20

TUBERCLED ORCHID

(*Habenaria* [illegible])

Plate 21

TUBERCLED ORCHID

(*Habenaria flava*)

insect visitors has long ceased to puzzle. It is deliciously sweet-scented, with the fragrance of Madonna Lilies.

Our desire to see this curious flower led us a few years ago to foregather with our partners at one of its recorded haunts in New York State. And there for the first time we saw the plant growing, unmistakable *Habenaria flava*. But as it had taken up its quarters in a tangled alder-run, the favorite lounge and stamping ground of cattle, it was far from satisfying to our æsthetic sense and the photographer was in despair.

Not long after, we happened to ferret out an old record of the Tubercled "in wet places on the Crow River at Marmora"; so next June two of us made a forty-mile scouting trip to that picturesque village. An hour's search revealed a colony of the plants on the east bank of the river, and in two days we had traced it up and down stream for several miles. The habitat of the plants is well worth noting, not simply for its peculiarity, but because it is evidently characteristic—an identical discovery having been made that same season in the neighborhood of Ottawa.

One of the Tubercled Orchid's favorite haunts, then,—it has others, of course—is along the low moist banks of running streams and on the borders of water-meadows where the ground is liable to frequent inundation. Shallow bays of black peat and alluvial mud where beds of iris and even cat-tails flourish, we found to be likely places. Only once did we see it more than three or four yards back from the river, and that was in a very low piece of pasture overgrown with willows and so swampy that the cattle grazing in the adjoining fields had been fenced off from it. In some of these inundated strips of river margin, the plants were very abundant, apparently spreading freely through the soft muck. Their dispersal is probably by water as well as by wind; the colonies had often the appearance of having started from seeds that had floated down stream and stranded on shelving banks at river bends or in the backwash of bays.

Our first set-up was made within half a mile of the village. It

was a picturesque spot: a low grassy shore facing bold wooded bluffs of limestone across the river; the plants growing in rich green turf near a thicket of willows. Close by, we discovered some small stems of *Habenaria hyperborea*, and as we could hardly tell the two kinds apart at a distance, we found great satisfaction in sitting down by the river bank and comparing Tubercled and Tall Leafy Green, point for point, at our leisure.

While the camera man and his first aid were at work, our second detachment, scouting along Beaver Creek a mile further up, happened on a glorious little river-bay, in which the Tubercled Orchid was very abundant. This proved a most fortunate find: the pictures taken that day were a disappointment, and the camera man was eager to try the new spot on our second trip. It was some consolation to know, as we followed the long winding trail once more over forty miles of craggy ridges and corduroy hollows, that we were bound for the most charming station you could well imagine for this orchid.

"Beaver Creek" bay had been partly under water at the time we discovered it, extra stop logs having been placed in the dam at Marmora to help tide over the midsummer drought. But the plants of a low river bank are well used to these ups and downs of the element by which they live; and we found the entire place alive with little groups of Tubercled, some standing more or less in the water, others high and dry well up the sloping banks of the bay. They were a small-statured race, but whether in firm sod or in squidgy beds of cat-tail and underbrush, they had an air of thrift and well-being as though conscious that their lines had fallen in pleasant places. Indeed the whole cove had a luxuriant look, from the flags and reeds at the river-brink to the Marguerites and Black-eyed Susans on its bordering slopes.

The middle space was livened into color by the Butterfly Orchid (*Habenaria psycodes*); its racemes of delicate mauve blending very beautifully with snow-white anemones and the soft-toned green of ferns and meadow-rue. Here in its grassy bower we

coaxed the Tubercled to have its picture taken; and then very agreeably we eased off from the camera to our lunch-basket, resting on the river bank in the lee of an old bridge.

II. BRACTED ORCHID

(*Habenaria viridis, var. bracteata*)

NAMES: Common: Bracted Orchid, Frog Orchid, Satyr Orchid. Specific: *viridis* (Linnæus), "green"—the color of the perianth; *bracteata* (Muhlenberg, 1805), "bracted"—because of its very long floral bracts.

PLANT: Roots: chiefly in the form of stout palmate (2–3-pronged) biennial tubers. Stem: leafy, 6–24 in. high. Leaves: somewhat 2-ranked, 2-5 in. long, obovate to lanceolate, 2 or 3 next base much largest, rapidly reduced above; floral bracts 2–4 times the length of the ovaries. Spike: loosely few-flowered to crowded, 3–5 in. long.

FLOWERS: Small, greenish, often tinged with reddish purple on anthers, lip, and spur. Sepals: green, lance-ovate, ¼ in. long. Petals: pale greenish-white, narrow linear, thread-like. Lip: greenish white, sometimes streaked with reddish purple; oblong-spatulate, ¼–⅓ in. in length; 2–3 toothed at apex, the sides prolonged into a pair of large lobes with a small tooth, more or less obsolete, in their fork; spur, very short, broad and blunt, whitish, delicate.

PLACE AND TIME: Distribution: Newfoundland and New England south to New Jersey, west to Alaska, British Columbia, and Washington. Habitat: damp woods and thickets, both deciduous and evergreen; in limestone areas frequent on knolls and slopes in open rocky woods. Soil Preference: subacid, but apparently tolerant of neutral. Season: May–August according to range, shade and moisture.

SPECIAL FEATURE: Lip 2-lobed at apex or very unequally 3-lobed.

The "Bracted" Orchid, notwithstanding its small flowers of inconspicuous green, is quite a notable personage in its way. Our New World form with its remarkably long floral bracts is peculiar to the Alleghany region, but varieties found on the Pacific Coast, and still more recently in Newfoundland, prove it the same as the well-known "Frog" Orchid of Europe and Asia. The very short saccate spur characterizing this plant throughout the northern hemisphere serves as a link between the Habenarias

Plate 22

BRACTED ORCHID

(*Habenaria viridis, var. bracteata*)

and some other orchid-groups in which the flowers have less highly specialized nectaries.

The plant ranges from half a foot to two feet in height, with stem fairly stout and foliage rather dark green. The three lowest leaves are much larger than the bract-like upper ones. The spike is usually broad and loosely flowered. The sepals are oval to lanceolate, the lateral petals narrow and thread-like. The lip is very long, like a strap, but widened toward the apex, the tip boldly bi-lobed at the sides and with a small tooth midway between. At the base of the lip, instead of the usual long tapering spur-like nectary, is a whitish pellucid oblong sac so delicate as to shrivel and turn brown long before the rest of the flower has withered. At the base of every pedicel springs a leafy bract several times the length of the flower.

In its choice of station it is somewhat fastidious, preferring damp shady woods to swamps, and deciduous trees to evergreens. But it is pretty generally distributed and, though not forming large colonies, seems to spread freely under favorable conditions. More than once we have found ourselves in districts—both limestone and granite—where it abounded. It has a special fondness for upland woods of beech and maple, where the drainage is rapid.

At Red Bay in the Bruce Peninsula we discovered quite lately an ideal station for this orchid. Up from the shore to the road, through thickets of evergreen filled with Coral Roots, Rattlesnake Plantains and Twayblades, ran a little woodland path. At its foot lay a baby bog; at its head stood a hardwood plateau. The bog was one of those rich little basins for which the district is noted, spilling over on to the beach in a springy bank of Fringed Houstonia, Selaginella, Sundew, and Butterwort. The plateau, lightly grown with maple and beech, was typical cover for Bracted Orchid. Its undulating floor rose up at one end into a flat-topped ridge overgrown with hemlock and cedar. Here we found most of the wood's outcrop of Bracted had harborage, cunningly hidden away behind the evergreens, luxuriant plants growing in close little

groups of three to five stems. Among them we noticed several whose flowers were conspicuously streaked with red-purple, a feature very strongly marked in the European Frog Orchid (*Habenaria viridis*).

In earlier days misfortune seemed to dog our footsteps whenever we set out to get a good picture of the Bracted. At last we determined to visit a distant wood where some unusually fine plants had been found the season before. Up hill and down dale we drove, fifty miles of "good macadam," bad roads, and no roads at all, till finally we drew up on the near bank of "Salt Creek" to find the bridge washed away. Our wise elephant of a Cadillac wouldn't, of course, tackle the gnarled old elm that had been felled across the stream in its place; but the man at the wheel, to our utter consternation, did—he actually walked it, upright, without a tremor; and looking round for applause was promptly denounced as "abnormal."

The rest of us were so perfectly normal that we took that rustic bridge in every conceivable way but walking: one straddling and backward—an orientation due to the rapid approach of some curious cattle,—the next straddling and forward, feet dabbling in the water when the bridge-limb sagged; and the last shinning along in a bear-hug round the trunk. He had the camera-pack on his shoulders; and half-way over, a backward-pointing snag inserted itself into the full depth of one of his breeches pockets. Three times the packman backed up, and three times the snag butted into his pocket. Finally as he neared the bridge-head, he felt the pack slip; at the same moment a hand caught the shoulder strap and he scrambled to safety. Next instant the superman, who had spent most of his time jeering at our efforts to walk the plank and shouting "Poor fish," as we wriggled painfully across, broke through the overhanging bank and tobogganed down a steep clay slope into the oozy depths of Salt Creek. The rest of the trip was without incident; entirely so, for on reaching the station for the orchid, we found it underbrushed out of existence.

Next day we drove, a decidedly sobered four, into the heart of some very beautiful country west of "Mount Pleasant." Of glacial formation, it is so boldly rolling and irregular that the roads are little travelled and their bordering woods unspoiled. Our objective was a spot where several ravines converge about a high plateau; unbroken woods occupy all the hollows, at one point enveloping a glacial ridge some two hundred feet high, steep and narrow as a railway embankment. From this point of vantage you look down, either side, on the tops of forest trees; southward, across a hemlock grove to a swamp of cedar and tamarac; northward, into a clean-floored hardwood bush of maple and beech, with occasional oak and towering giants of butternut and basswood. Here in peace and quiet live a multitude of creatures of the wild, both plant and animal.

Among the plants are scattered colonies of Bracted Orchid. These occupy the slopes and summits of knolls—some of them quite high—with which the wood is filled. They are a small race, pale, slim, light of foliage, and few-flowered; yet perfectly healthy and abundant. A peculiar feature about them is their early flowering. We had always thought the end of June about right for this orchid; and then, three or four years ago, coming out to this wood the last week of May to look at a colony of Showy Orchis, we discovered, a few yards up the slope from their budding stems, some stalks of the Bracted out in full flower. Their early maturing is probably "Hobson's choice" with the plants: they are solely dependent for moisture on the melting snows of April, for the wood is quite without springs and its slopes are bone-dry by June.

Just as we reached the top of the plateau, out raced a red fox from the wood's edge and went streaking across the open. The sight of it reminded us of our first visit to this wood. We had been exploring some of the innumerable little gullies and slopes down in its depths, and glancing suddenly up from poring over a small group of Bracted Orchids we saw on a low knoll right

in front of us, couched flat on the ground, head resting between its outstretched paws, a yellow-brown collie, staring intently at us. We made a step or two forward, and immediately the collie dived head-first into the ground and disappeared. It was a red fox.

Here, below Reynard's earth, we secured our first picture of *Habenaria bracteata;* and after the usual "photographer's fun" of fighting insects, shadows and wind, we repaired for a well-earned rest to some pines at the end of the ridge, where we ruminated pleasantly over the scene; in front of us a winding wooded valley in the midst of rolling downs; almost at our feet, a spruce swamp, treasured haunt of *Calypso bulbosa;* at our backs the big old hardwood, with its fox's den, its butternuts and morels, its ferns and flowers, its Striped Coral Root and Showy Orchis, and last—but by no means least—its scattered colonies of Bracted Orchid.

III. NEWFOUNDLAND ORCHID

(*Habenaria albida, var. straminea*)

NAMES: Common: Newfoundland Orchid, Highland Orchid, Heath Orchid, Trident Orchid, Fish-spear. Specific: *albida* (Linnæus, 1753), "whitish," in reference to the very pale creamy or greenish white of the flower spike as a whole; *straminea* (*sp.* Fernald, 1926), "straw-colored," descriptive of the form found in the Belle Isle Straits.

PLANT: Stem: 4–14 in. high; leafy. Leaves: 2–4 lower ones, obovate to spatulate; reduced to lanceolate bracts above; floral bracts twice the length of the ovaries. Spikes: 1–4 in. long, about 1 in. wide, cylindrical, crowded.

FLOWERS: Numerous; whitish outside, pale creamy or greenish white inside; vanilla-scented. Sepals: whitish, tinged with green on the back near the base, lance-ovate, 1/6–1/8 in. long. Petals: similar, pale creamy with greenish tinge, hardly so long; inconspicuous, connivent with upper sepal. Lip: pale creamy white, somewhat fleshy, 1/5–1/8 n. long, round-cuneate, apical half deeply cleft into three nearly equal prongs; lateral pair more or less falcate, lanceolate and pointed; middle one broader, more oblong, and blunt; spur, about half the length of the ovary, delicate, cylindrical, blunt.

PLACE AND TIME: Distribution: north-west Newfoundland, chiefly east end of Belle Isle Straits; also, Greenland, Iceland, Faroes; a luxuriant form

of Eurasian *H. albida*. HABITAT: turfy limestone barrens, peaty glades and open slopes. SOIL PREFERENCE: sub-acid to neutral. SEASON: mid-July–early August.

SPECIAL FEATURE: Lip equally 3-lobed at apex, lobes long.

THE Newfoundland Orchid is so nearly identical with the European *Habenaria albida* that it remains a moot point whether the differences of size and lip-texture are more than varietal. It was not discovered till 1925, but it is interesting to note that its occurrence "in Arctic America" was forecast by Prof. Oakes Ames as early as 1910. So far it has been found only along the south shore of the Straits of Belle Isle, abundant at the east end, very rare at the west; but its discoverer, Prof. Fernald of the Asa Gray Herbarium at Harvard, thinks that sooner or later it will be met with in similar tracts further south.

The plant stands anywhere from 6 to 12 inches in height and has several leaves on the stem, spatulate below, lanceolate above. It bears a crowded cylindrical spike of bracted flowers, whitish, the sepals with a greenish tinge near the base, the petals creamy. The lip has a rather short blunt spur, is yellowish-tinged on the face and deeply cleft at the apex into three nearly equal lobes, the outer pair slightly falcate and pointed, the middle one more oblong and blunt—a miniature trident.

This far north-easterly trail led us into a corner of the world we had viewed more than once with curious eyes from the deck of an ocean liner. To the thrill of a whole new realm of beautiful flowers it greatly added enjoyment to cruise through the Gulf of St. Lawrence within easy reach of its shores, to set foot on the Canadian Labrador and the west coast of Newfoundland; above all, to meet the kindly fisher folk of the Straits and be welcomed so warmly into their homes.

It was after a seven-hour motor-boat run from Flower's Cove that we finally stepped ashore at Cook's Harbor, on the afternoon

of July 20, 1929. Our orchid had been found all about the shores of Pistolet Bay, but in greatest abundance just here by Cape Norman; and shortly after landing, as we quartered the peaty tundra overlooking the bay, we recognized its unmistakable form. "Unmistakable" even at a distance of several yards, because we had found it in Scotland just two years before.

In spotting our first plants at long range like this, it struck us they weren't so badly named after all. Set on strongly deflected ovary-ends, the flowers are decidedly "nodding," and it's their backs you see when you view the spike as a whole; these are distinctly whitish in contrast with the green of the stem and foliage. But once you come to close quarters and look the flower in the face, what strikes you most is the creamy-yellow lip. So that "whitish" (*albida*) and "straw-colored" (*straminea*) are pretty much the two sides of the shield. One thing certain, the Newfoundland plant outpoints its Perthshire cousin in every way; it is three or four inches taller, has flowers more than half as big again, and is much more strongly fragrant of vanilla.

It was too late the first day to make much of our new discovery, and the "morn's morn" broke with a pronounced Scotch mist, half drizzle half fog. However, we stuck to our field work all morning, and later when it cleared we were even able to try our hand at some pictures. Shortly before lunch, while tracing the range of our orchid just north of the cove, we had an encounter that greatly pleased us. On the eve of our run through the Straits we had made our way over to Savage Cove, the most westerly point at which *Habenaria albida* has so far been seen. There was no time to search for the orchid, but thanks to Professor Fernald, whom we had met on board the *Sagona*, we had no trouble in finding the Mountain Cystopteris, that rarest and most beautiful of alpine ferns; magnificent colonies with fronds like very delicate filigree work. And now, on a low bit of limestone escarpment we discovered some clusters of Holly Fern.

Holly Fern, Mountain Cystopteris, and *Habenaria albida!*

Plate 23

From a photograph by Frank Morris

NEWFOUNDLAND ORCHID

(*Habenaria albida, var. straminea*)

From a photograph by Frank Morris Plate 24

NEWFOUNDLAND ORCHID

(*Habenaria albida, var. straminea*)

Who would ever have thought to meet three such thorough-bred Scotchmen as these, the biggest celebrities of our native Perthshire, foregathering in the Straits of Belle Isle! Among our earliest triumphs in fern-hunting had been to find the Holly Fern and *Cystopteris montana* side by side on the upper slopes of Ben Lui; and two short summers ago, when we looked up from our first close survey of this moorland orchid, *Habenaria albida*, there was Ben Lui mounting guard in the distance.

The mile or more of broad headland where our Newfoundland Orchid grew was in appearance much like a Perthshire moor. It had practically every form of heath you could think of except heather; and the luxuriant green mats of Crowberry might well have been "ling." The blend of limestone and peaty tundra, as on the Mingan Islands and at the west end of the Straits, was wonderfully prodigal of flowers, calcicoles and acid-loving plants hob-nobbing in the friendliest way together. "Plumboys" and "Bake Apples" (*Rubus arcticus* and *R. chamæmorus*), the favorite fruits of the Straits, were abundant everywhere; so were Primulas, especially the dainty dwarf white, Butterwort and the Small-flowered Anemone, Rose Root and *Dryas integrifolia*; several sorts of Grass-of-Parnassus and at least two of Gentian just budding out; Ladies' Mantle (*Alchemilla*), Canadian Burnet and a very pretty Honeysuckle (*Lonicera villosa*). On strips of stony barren we found Moss Pink and a sturdy form of Thrift—last seen many a long year ago in old England. We also, to our great delight, added two more to our list of Saxifrages. At the Mingans we had seen both the single-flowered kinds in bloom, the Purple as well as the Tufted (*S. oppositifolia* and *S. cæspitosa*); here we found the two "Live-longs" (*S. aizoon* and *S. aizoides*), their little cactus-clusters of leaves bearing scapes each crowned with a head of flowers, the White in full bloom, the Yellow with just a glint of gold in its swelling buds. Another new acquaintance we were glad to meet was the Bartsia or "Velvet Bells" as the children of the Cove have named it.

The Newfoundland Orchid did not seem to like the stony barrens, but rather the damp peaty turf on the richer parts of the heath, especially where it could find some cover from the searching wind, green laneways and cirques among thickets of scrub fir, trenches beside the coast trail, little hollows, gullies and protected plateaus below the cliffs. Quite the most interesting of its orchid companions was a dwarf form of *Habenaria viridis*, much more like the British Frog Orchid than our familiar Bracted, and growing in great abundance on most of the headlands through the Straits. Other orchids with which we often found it associated were the three Habenarias most common in the north, the Tall Leafy Green, the Leafy White, and the Blunt-leaf; occasionally, too, the flat-petalled form of Yellow Lady Slipper and the Heart-leaved Twayblade; the last nearly always with rich crimson-purple flowers, as at the Mingans.

The most delightful bit of orchid-trailing in our whole trip was on the east slope of Cook's Point. While following the lure of *Habenaria albida* along a series of green turfy plateaus that went sidling down to the beach, we ran right into quantities of Little Round-leaf Orchis and Calypso in bloom. We had seen both growing in just the same way on Eskimo Island, but never together; right in the open, the Orchis following the trickling course of little springs where the limestone floor was only thinly carpeted with humus, the Calypso occupying a series of green turfy stools and benches between the cliff and the beach. There were four or five of these Calypso colonies, all more or less isolated, the smallest with 20–30 flowering stems, the largest with over 150 by actual count, and that in a space not more than 8 feet long. A prettier peep into Fairyland couldn't have been; scores upon scores of these marvellous blooms, like little pixies thronging their eyots of green.

At this point, the shore line receded into a miniature cove with a grassy gully at its head, through which we climbed once more to the main plateau. Near the top our gully narrowed to a kind

of fissure or sloping chimney, green, turfy, and damp. In its kindly embrace, well screened from the wind, we found a perfect wild garden of moorland flowers. Among them were more than a score of *Habenaria albida*, beautiful plants, some of them a foot high, growing both in the open and among straggling branches of willow and shepherdia.

Alongside one group of these, on a moist bit of slope, stood a colony of *Habenaria dilatata*; a most refreshing find, the two "smell-bottles" of the Straits in adjoining nooks, exhaling each its peculiar perfume of vanilla or of cloves. Snuggling close to the ground with another group were some stubby plants of Broad-leaved Twayblade. The Bartsia was quite abundant here, and an occasional stem of Yellow Rattle, smaller in form than some we had seen at Cornerbrook.

This one-quarter mile of orchid trail, dotted all the way with *Habenaria albida*, its kindred and companion flowers, was a trail to retrace as well as remember; down the green terraced slope from the thickets of dwarf spruce to the beach, past the Calypso islets, round the curve of the little cove, and up the chimney to the wind-swept moor once more. It was here that we first chanced on our orchid in perfect form, here too that we chose to take our last look at it—the beginning and the end of our trail of the Newfoundland Orchid.

IV. LITTLE CLUB SPUR ORCHID

(*Habenaria clavellata*)

NAMES: COMMON: Little Club-spur Orchid, Small Green Wood Orchid, Frog-spike. SPECIFIC: *clavellata* (Michaux, 1803), "like a small club," alluding to the shape of the spur.

PLANT: STEM: angled, 8–18 in. high; 1–2-leaved below, bracted or occasionally bare above. LEAVES: oblanceolate to spatulate, 2–6 in. long; floral bracts shorter than ovaries. SPIKE: short, wide, cylindrical, 1¼–2 in. long, 3–16-flowered.

FLOWERS: Small, pale greenish or yellowish white, set out on spreading ovary-pedicels. SEPALS: pale greenish white, ovate, 1/5–¼ in. long. PETALS: similar,

but paler. LIP: creamy, wedge-oblong to spatulate, truncate-sinuate at apex into 3 short blunt teeth; spur about ½ in. long, exceeding the ovary, upcurved and club-thickened.

PLACE AND TIME: DISTRIBUTION: Newfoundland south to Florida, west to Mississippi Valley, Minnesota to Louisiana. HABITAT: bogs and moist soil in shelter of woods or herbage. SOIL PREFERENCE: strongly acid-loving, often found in sphagnum, uncommon in limestone regions and only where acid conditions prevail. SEASON: July–August.

SPECIAL FEATURE: Lip equally 3-lobed at apex, lobes very short.

THE Little Club-Spur or "Small Green Wood Orchid," as most people call it, is peculiar to our northeast; it is not at all rare, just uncommon enough to make you feel pleasantly at home when you meet it on a far journey. Our trails have been dotted with these casual encounters all the way across from Northern Ontario to New Brunswick and down to Tennessee.

The plant stands as a rule 6–14 inches high; near the base is a single oblong or oblanceolate leaf, sometimes a smaller one above it, then 3 or 4 bracts; as a whole the stem is so little leafy as to constitute a bracted scape, surmounted by a short, wide, nearly cylindrical spike of small greenish-white flowers comparatively few in number. The lip is broad wedge-shaped, being greatly widened at the tip and having a sinuate edge forming 3 short blunt lobes; the long spur is noticeably thickened toward the end and as a rule bent into a bold curve like the slender abdomen of a stinging insect.

An interesting feature about this orchid is the "set" of the flower. It is almost invariably slewed round a quarter-turn so that the lip stands at the side. Several other long-spurred orchid blossoms, for the convenience perhaps of insect visitors, tilt their nectaries into a horizontal position, but they do it by a movement up or down, forward or back; the Wood Orchid does it by leaning over on its side.

The shape of the spur, too, is very variable. On a trip through Maine once, where this orchid was very abundant, we came across

LITTLE CLUB-SPUR ORCHID

(*Habenaria clavellata*)

Plate 26

LITTLE CLUB-SPUR ORCHID

(*Habenaria clavellata*)

a curious "local race," which the photographer recorded with his camera. The tip of the spur was double, being notched into a pair of tiny nipples. This tendency to bifurcate has been explained on evolutionary lines. The orchid-lip is complex, having absorbed a pair of stamens; hence its frequently tripartite form, its lobes, ridges, spur, and cup,—even the cloven toe of Calypso's shoe.

Taken all in all, it is probably most abundant in fairly dense cover—woodland swamps and the mossy borders of damp thickets; indeed, its familiar name of "Wood Orchid" seems to imply a distinct fondness for shady retreats. But like so many of its kind it has two quite widely different haunts and flourishes equally well in both.

At one station which lies within easy reach of us, we have been able to make a pretty close study of its habitat. This is a large peat bog embracing the most diverse conditions of moisture and shade. The only places where the Little Club-spur has never found a foot-hold are a dry bare strip bordering on one of the "municipal ditches," and a partly submerged area where Fragrant Whites abound. Elsewhere it is quite at home, in thoroughly moist spots among sedge and coarse herbage, deep in sphagnum beds, along the borders of thickets and even in cedar aisles; the companion, now of Ram's Heads and Yellow Lady Slippers, now of Arethusa and the Small Round-leaf Orchis, or again of Hooded Tresses and the Green Adder's Mouth.

In early days we had come to associate it entirely with the deep shade of low woods or swampy thickets. But now we judge it just about as well able to take care of itself in the open as Loesel's Liparis. We well remember our gasp of surprise on first meeting it so situated. It was the top rung in a ladder of surprises that met us the first day we went fern-hunting in a northern Forest Reserve. We had just come through a piece of wet spruce bog, and were emerging along a deer trail, flushed with the triumph of adding three new ferns and two club mosses to our list. Few things were further from our thoughts than orchids,

when the hoof prints we were following brought us to a stretch of wet sand supporting a regular happy family of plants on its surface. Several of these were entirely new to us then—Yellow-eyed Grass, Horned Bladderwort, Long-leaved Sundew, Little Bog Club Moss; and, sharing their quarters, behold! a number of stems of Small Green Wood Orchid.

Nor was this open daylight colony a mere freak of wind-blown seed. We found dozens of similar stations in wet sandy gravel, along the right-of-way of the old Booth Railroad and about the borders of peaty lakes. Well! we live and learn. It is things like these that give zest to one's field-work. Here were we, after whole seasons of contented assurance, suddenly forced to reconstruct all our ideas about the Small Green Wood Orchid, its haunts and habits.

The most delightful spot we ever met it in was the margin of a beaver pond, with a very romantic forest setting. Its shores proved a summer resort for more rare plants than we had ever found together before. There was magic about that lake from the very start. We hadn't made three paces along the margin before we were whisked off to Scotland and the days of long ago. For there in front of us, to all appearance, stood stems of the very Quaking Grass that as children we used to gather in Glen Almond, looking taller and handsomer than ever. It proved to be the Canadian Rattlesnake Grass (*Glyceria*), and we have found it since in the New England Mountains. Other treasures of the shore were the Aquatic Lobelia (*L. Dortmanna*), the Humped Bladderwort (*Utr. gibba*) and the rare Little Purple (*Utr. resupinata*). Scattered along the margin were abundant spikes of Hooded Tresses, and also our Little Club-spur in just the same company as before. Standing on the smooth bare floor of sand it looked so delightfully trim, with its slender scape and dainty little spike of labiate blossoms, long-spurred and tilted on their pedicels.

V. YELLOW FRINGELESS ORCHID

(*Habenaria integra*)

NAMES: COMMON: Yellow Fringeless Orchid, Small Southern Yellow, Golden Fret-lip, Frog-arrow. SPECIFIC: *integra* (Nuttall, 1818), "entire"-edged, probably to distinguish its lip from that of the Yellow Fringed.

PLANT: STEM: 10–24 in. high, angled; leafy below, bracted above. LEAVES: 1 or 2, lanceolate, 2–6 in. long, scoop-like and recurved; floral bracts equalling ovaries. SPIKE: blunt-conical to cylindrical, 1–3 in. long, 1 in. or more wide, trim, crowded.

FLOWERS: Golden-yellow, about ⅓ in. across. SEPALS: round-ovate, concave; lateral pair spreading, about ⅙ in. long, upper one smaller, overarching. PETALS: about ⅛ in. long with incurved tips meeting under the dome of the upper sepal. LIP: ovate, about ⅙ in. long, entire, crenulate or cut-toothed on margin; spur awl-shaped, 3/16 in. long, shorter than ovary.

PLACE AND TIME: DISTRIBUTION: Florida and Gulf Coast north to New Jersey and Tennessee. HABITAT: moist grassy places, open boglands and pine-barrens. SOIL PREFERENCE: intense acidity, as in sphagnum, rotting wood, etc. SEASON: July in south, August–early September in north.

SPECIAL FEATURE: Flowers golden yellow, lip tongue-shaped, not fringed.

THIS orchid is quite happily named; for, like the Purple Fringeless, it has two sisters that share its complexion and wear a fringe. It is even rarer than the Snowy, and more exclusively southern. Its presence in New Jersey, some 200 miles out of bounds, adds one more to the long list of plant anomalies for which the Peninsula is famed; forming, as it does, a common meeting-ground for north and south where the two life-zones overlap.

The plant is usually rather more than a foot high. It has but one fully developed leaf, which springs from a strongly clasping base near the ground; lanceolate, with the sides somewhat curled up from the mid-rib, and the outer half recurved like a shoe-horn. The flower spike is at first blunt cone-shaped, but later, cylindrical. It is dense, compact, and trim in appearance; in color, the purest golden-yellow.

The flower sepals are strongly concaved and rounded, the lateral pair wide-spread and with pointed tips. The side petals form a hood with the upper sepal, their tips meeting under its dome. The lip is dilated at the sides into the form of an oval tongue, wavy-margined and slightly cut-toothed; the spur at its base is straight and rather longer than the lip.

It may be only a pleasing fancy, but to us, with its dilated, crenulate lip, this orchid seems distinctly to prefigure the Tongue-fringed group of Habenarias; and we should link it closely up with the Crested and the Yellow Fringed. Its color is not nearly so rich as theirs; but the whole plant, from the pointed, stiffly curving leaf at the base, up the wand-like bracted stem, to the golden-yellow terminal cone of blossom, is both attractive and unusual.

So far as known, the original records and museum specimens of this plant in New Jersey—three or four all told—came, every one of them, from Egg Harbor and other points in the Pine Barrens. They date back to the middle of last century. For more than fifty years after that the plant was never reported, nor could the most rigorous search by professional botanists detect it. Dr. Witmer Stone whose fine work on the New Jersey flora appeared in 1909 was obliged, after many seasons of unremitting effort, to record a blank. Hardly had his Flora been issued than this long-lost treasure of the Pine Barrens came out of hiding and in a new locality.

The story of the find as told to us *on the spot* is very interesting, and we cannot help suspecting that there may be other little colonies of this rare exotic "born to blush unseen" almost annually in out-of-the-way corners of New Jersey's vast and often pathless barrens. It would appear that a lover of wild flowers travelling on the train to Cape May spied along the right-of-way from his car window some patches of yellow blossoms, which immediately struck him as different from anything he had ever seen before. On the return trip he got off at a little wayside station,

Plate 47.

YELLOW FRINGELESS ORCHID

(*Habenaria integra*)

Plate 28

YELLOW FRINGELESS ORCHID

(*Habenaria integra*)

walked some miles along the track, and boarding a later train was whisked up to New York, yellow nosegay and all. By good luck his flowers came under the eye of an expert, and there, masquerading among Crested, Yellow Fringed, and Canby's Cross, were spikes of the long-sought *Habenaria integra*.

But the railroad is no sanctuary for wild flowers. Once the section gang go swinging their scythes down the right-of-way in their annual clean-up, there's little left to bloom in August. Year after year the fame of the Yellow Fringeless has brought many an eager pilgrim to the spot, but you could count on the fingers of one hand the lucky few who have found it in flower. Our chance of success, we learned, was very small; the only local botanist who knew the spot had drawn a blank every trip. But our eagerness to be the Jasons and win the Golden Fleece would take no denial; so presently off we set on the great adventure.

The spot proved agreeably secluded and almost on the fringe of the Pine Barrens. From the nearest railway station a rough wagon road ran alongside the tracks just far enough to screen us from view, and then suddenly ended in sand. In front of us stretched the narrow roadbed with its twin ribbons of steel, laid right up and down through the middle of what was in effect a broad grassy glade bordered on either hand by woods of pitch-pine and oak. And just within the right-of-way, at the other side of the tracks, behold! a little footpath that jogged invitingly along by the wood's edge; a nod's as good as a wink on the orchid trail, so we all immediately followed its beckoning lead.

Presently we spied just ahead of us a clump of White Fringed Orchids and beyond them a shallow dip. No sooner had we reached this than we began to find abundant traces of bog-flora mingling with the more upland flowers of the prairies; Yellow-eyed Grass (*Xyris*) along with brilliant orange and rose heads of Milkwort; Rose Pogonia (in seed) and Long-leaved Sundew among patches of Meadow Beauty (*Rhexia*); Bog Club Moss (both Chapman's and Foxtail), Cinnamon Fern, and Colic Root, side by side with

Ludwigia and Blue Curls—that daintiest and most fairy-like of the Mint Family; even, if you please, spikes of Crested and Yellow Fringed Orchids within bowing distance of the Golden Aster (*Chrysopsis*).

We were just at our busiest taking in the details of this wonderful garden plot of Nature's planting, when suddenly from the lynx-eyed member of our little expeditionary force rose the familiar "squeal o' joy," more glad to our ears than ever huntsman's "View Halloo!" There was a wild rush to the spot, and—incredible as it seemed—right in front of us, beautifully grouped here and there in the long grass, stood over a dozen spikes of *Habenaria integra.* How we gloated! We had won the Golden Fleece.

Altogether we found some 26 spikes of this orchid, and it was very hard to tear ourselves away from the spot. During our sojourn at Cape May we paid no fewer than three long visits to this distant station, and on each of these visits, while we wandered about the neighboring woods and grasslands exploring, every now and then one or other of us would be seen trekking off to the grassy cover for one more last revel in Yellow Fringeless.

Nothing that we found to compare them with, during all our stay in New Jersey, seemed half so lovely. Not the least of their charm lay in the exquisite trimness of the flower spike, the smooth-edged blossoms being crowded into an almost solid cone of the purest golden yellow. Between buttercup and primrose, it was not orange, but almost exactly the color of Golden Corydalis.

VI. SNOWY ORCHID

(*Habenaria nivea*)

NAMES: COMMON: Snowy Orchid, Small Southern White, Bog Torches, Frog-spear. SPECIFIC: *nivea* (Nuttall, 1818), "snowy"—the color of the flowers.

PLANT: STEM: slender, angled, 12–24 in. high; leafy below, bracted above. LEAVES: 2–3, lance-linear, sheathing, 2–10 in. long; thick, pithy, conduplicate, keeled; floral bracts exceeding ovaries. SPIKE: 2–4 in. long, ¼–1¼ in. wide; narrow to wide cylindrical early and late, pyramidal to conical at mid-season, crowded in bud, loose-flowered later.

FLOWERS: Snow-white, ½ in. wide, resupinate, lip uppermost and erect. SEPALS: oval; middle one below, deflexed; lateral pair wide-spread, concave, falcate, obliquely curved near base and prominently lobed on upper edge—pair of lobes erect in bud together, thumb-like; later directed backward with tips meeting behind lip. PETALS: ¼ x 1/16 in., half as wide as sepals, less spreading, more deflected. LIP: lanceolate, ¼ x 1/10 in., supported behind by sepal-lobes, recurved; spur, twice length of ovary, ⅔ in., long, slender, ascending, sharply elbowed near tip.

PLACE AND TIME: DISTRIBUTION: Florida and Texas north to New Jersey and Delaware. HABITAT: wet open bogs. SOIL PREFERENCE: strongly acid. SEASON: May–June on Gulf Coast; August–September at north of its range.

SPECIAL FEATURE: Flowers white, lip above, strap-shaped, long-spurred.

AMONG all our orchid friends we have no greater favorite than the Snowy. There is something peculiarly attractive about the soft-white spikes and quaintly poised blossoms with ride-a-cock spurs. It is besides a rare visitant within our borders, though doubtless an every-day sight in the Gulf States.

Curiously enough, though at the very last yard of its northerly range in southern New Jersey, it is lavishly abundant there about the few bogs where it makes its home. And still more curiously, not one of these stations had been discovered twenty years ago; the label—"New Jersey," found on one or two old museum specimens, was actually discredited. Yet the bogs are quite open, in the very heart of an area of "intense culture," and within sight of houses and well-travelled roadways!

It stands 1–2 feet in height and is leafy-stemmed. Only the

two lowest leaves grow to any length, and these are quite narrow, mere straggling ribbons. As with many of the reeds, they are thick and pithy, with strongly keeled midribs and sides folded together lengthwise. The long sheathing bases are close clasping and appear to ride the ridges of the fluted stem. Above, the stem has the form of a slender scape, beset with closely appressed pointed bracts. Surmounting it is a flower-spike some 3 or 4 inches long, and quite narrow in its earlier stages, bristling with bracts and crowded with small white buds. The ovaries, though really green, show glints of grayish white, owing to the minute hoary pubescence that clothes them. They are almost unique in being straight, instead of twisted, so that the lip is uppermost.

As the buds mature the ovaries are depressed on their pedicels, and the young flowers ride out from the stem, cocking their long spurs up behind them as they go. The spurs are more than twice the length of the ovaries, gracefully slender, tip-tilted, and quite plainly seen to project from the upper part of the flower.

When fully open, the flower forms two halves, the side sepals interlocking with the lip above, and the petals approaching the mid-sepal below. The lip rises strongly up at the top of the flower, its apical half flung back on itself like a long tongue, its basal half braced against the sepal-lobes, and its slender curving spur carried back across the stem. The lateral sepals bear down on the lip with their thumb-like lobes clinched behind its base, and then spread gracefully out in a folding curve. The lower half of the flower forms a blunt-pronged trident in form almost exactly like the three-lobed lower lip of a Lobelia.

The whole flower-spike, with its loose raceme below of pure white open blossoms and its sharply constricted tip of bracted buds above, presents a very striking appearance; it suggests a broad-based spearhead with long tapering point. To meet as we did a whole army of these bristling spears among the tall sedges of a New Jersey bog is enough to thrill the heart of any botanist.

Our favorite haunt for this charming orchid was a marl-bot-

Plate 29

SNOWY ORCHID

(*Habenaria nivea*)

Plate 40

SNOWY ORCHID

(*Habenaria nivea*)

tomed marsh meadow, roughly oval in shape and several acres in extent. Converging slopes at the upper end, too gentle for the eye to detect, serve to gather the rainfall into a broad central groove running the full length of the meadow; at the lower end, the water, finding no outlet, keeps soaking in, backing up, and overflowing its channel with every rainstorm even as late as mid-August.

Frequent floodings, followed by rapid evaporation under a sweltering sun, have long since converted the potential hayfield into a genuine bog, full of sedges, cotton-grass, bog asphodel, colic-root, bog club-moss, yellow-eyed grass, sundews and bladderworts, even occasional pitcher-plants and patches of sphagnum. Every time we visited it, we made some fresh discovery; to us, of course, most of the Cape May flora was new, but we found that even among the "big-wigs," far and wide, this Bennet bog was famous for its rarities.

These included many orchids. Scattered here and there along both margins we found spikes of the Giant Ladies' Tresses (*Spiranthes præcox*); at the head of the bog these stopped just short of a colony of White Fringed Orchid (*Habenaria blephariglottis*), among which we noticed a few spikes of Canby's buff-colored hybrid; while, at the lower end, they brought us within sight of a patch of brilliant orange Crested (*Habenaria cristata*). Seed-stalks of Rose Pogonia were not uncommon; and we were told that at one spot, in spite of the mowers' annual menace, even so great a prize as the Spreading Pogonia (*Cleistes divaricata*) had held its own for years, till finally uprooted by the reclaiming ploughshare.

Of the many flowers new to us, other than orchids, two proved specially attractive from their close companionship with the Snowy. The first of these, the Rattlesnake Master (*Eryngium aquaticum*), though really an umbel, reminded us of a diminutive teasle, with its symmetrical branching stems, spiny foliage, and dense bristle-bracted heads of small bluish flowers, all dusted

over with a pale gray bloom. And then there was the curious little composite, *Sclerolepis uniflora*, with its slender somewhat prostrate stems crowded with leaf-whorls like a Scouring Rush and tipped with pink button-heads of inflorescence.

When we first came upon this bog, the whole margin on our left was knee-deep in spreading sprays of Lance-leaved Centaury, the most beautiful of the white-flowering Sabatias; and a thicket of Sweet Pepperbush (*Clethra alnifolia*) on our right filled the air with delicious fragrance.

It was between this thicket and the spreading waters of the central channel that we first spied the Snowy Orchid. It was growing in great profusion among the marsh grasses and sedges, never venturing very far from the soft spongy tracts of the border, unless to descend into standing water—much as the Leafy Whites of the north (*Habenaria dilatata*) wade out into open peat-bogs. Within its chosen limits it formed a wide band almost entirely girdling the bog. And it was at the very hour of its perfection that we happened upon it, the lower half a spreading raceme of newly opened flowers and the upper half a narrow bracted spike of pearly buds. Not merely was it beautiful as a whole, but the individual blossoms had a strange charm; as you looked them steadily in the face, they seemed to catch your eye and look back at you in a curiously responsive way. For pure beauty, we all agreed, nothing in the whole bog could compare with *Habenaria nivea*, the Snowy Orchid.

VII. TALL LEAFY GREEN ORCHID

(*Habenaria hyperborea*)

NAMES: COMMON: Tall Leafy Green Orchid, Tall Northern Green, Tall Northern Bog Orchid, Green-lance. SPECIFIC: *hyperborea* (from Linnæus, R. Brown, 1813), "beyond the north."

PLANT: STEM: mostly stout, 8–36 in. high, leafy. LEAVES: narrow-oblong to lanceolate, gradually reduced above to bracts, 2–12 in. long.

FLOWERS: Small, green or yellowish-green, crowded in a long, narrow, bracted spike. SEPALS: green, lanceolate, 1/6–1/4 in. long; lateral pair spreading. PETALS: similar, but paler and erect. LIP: pale whitish green, blunt-lanceolate, 1/4 in. long; spur, slender or sometimes clavate, about the length of the lip, shorter than the ovary.

PLACE AND TIME: DISTRIBUTION: Transcontinental; Labrador to Alaska, south to Pennsylvania, and across to Oregon; also Iceland and Greenland. HABITAT: ubiquitous; open and shady places, peat bogs and wet woods, riverbanks, grassy slopes and wet gravel. SOIL PREFERENCE: indifferent. SEASON: June–August.

SPECIAL FEATURE: Lip, green, lanceolate, uniformly tapering.

BEYOND a certain pleasing symmetry, the Tall Leafy Green or Northern Rein-orchid has nothing remarkable to show for itself, and yet it is a very general favorite. The fact is, in nearly every orchid-hunter's experience it is so closely associated with the very earliest of his triumphs that the sight of it rouses a strange sense of pleasure and expectancy. Its book-name *hyperborea*, so poorly rendered "northern," has in reality all the romance of far away and long ago. Readers of Herodotus will remember that in the morning of time the Hyperboreans were a mysterious race of beings "beyond the north" (*hyper-borea*) of the ancient world.

It is one of the commonest of orchids in the northern hemisphere and very widely known. In the Old World it fully justifies its name, being native to Iceland and Greenland. With us it is transcontinental and ventures as far south as the latitude of Pennsylvania and Oregon. Hardy and prolific, it maintains itself in all kinds of habitats and flowers according to climate from early summer to late.

It stands from 8 or 10 inches to 3 feet in height; a robust, upright, leafy stem, the foliage regularly diminishing in size from lanceolate or narrow-oblong leaves below to slender pointed bracts above; ending in a long narrow spike of close-set crowded green blossoms; the flowers, on erect pedicels, snuggling right in to the main stem; the sepals ovate, the petals lanceolate; the lip long and tapering like the tongue of a strap.

It attains its greatest size in the depths of moist bogs and swamps, usually growing in the open among sedges. But it is often met with in damp shady woods, and even many less romantic scenes; being a familiar sight in moist pastures, along the edges of willow swamps, on the banks of rivers and lakes, in springy soil by roadsides and railways. And we are always glad to see it, so closely are its memories linked up with other, rarer, more beautiful orchids.

Like most amateurs we made the acquaintance of this orchid in the very earliest of our bog-trotting days; long before we had had the luck to meet either the Bracted or the Tubercled. Indeed we well remember the days—not so far off either—when we eagerly examined every new colony of Tall Leafy Green in the hope that at last we had run to earth the rare and elusive *Habenaria flava*. Of course the lip in each of these three plants is so entirely different that a mistake at close quarters is impossible; but even at a little distance the "Northern Rein-orchid" presents a marked contrast to the other two with their wider leaves, often two-ranked, and comparatively short loose floral spikes.

It is a very rare thing for the first sight of any common plant to live on in the memory. But it so happens that one of us can recall very vividly the day he first set eyes on the "Tall Leafy Green." He was still a stranger in a strange land and everything was new to him. He had set out this day to explore his first wooded swamp. The outer guard of the moat—a sludgy tract of willows and cat-tails—had already been overcome; and then, after a fierce tussle with fallen logs, "tanglefoot" yew and thickets of cedar, he suddenly broke through this belt of dense

Plate [illegible]

TALL LEAFY GREEN ORCHID

(*Habenaria hyperborea*)

Plate 42

TALL LEAFY GREEN ORCHID

(*Habenaria hyperborea*)

cover and emerged, to his infinite surprise, in a little sun-bathed clearing.

Its surface was soft and cool with yellow-green bog-moss, broken here and there by scattered shrubs and big ant-hills of crumbled peat. These little glades in the heart of our wooded swamps, "muskegs" as the Indians call them, are so familiar a sight with us all that they no longer awaken a thrill; but for our tenderfoot, to step into such a secluded little nook full of rare floral treasures was like stumbling into Fairyland.

The lonely hush at the wood's heart seems always to fill us with a strange sense of awe. For all the hundreds of times that we have penetrated to the home of these shyest of woodland denizens, the orchids, it is still with bated breath that we step from the shadow of the trees into the sunlit space beyond. There is a feeling of mystery as though we might at any moment meet something strange and new, from beyond the bourn of all experience. This eerie sense of the supernatural was fed that day by a startling sound from the depths of the wood that made our explorer pause to listen, while his heart thumped out an involuntary echo. At first it was as though some one were beating the ground with a heavy mallet, but presently the blows grew so rapid as to make a continuous whirr. During the hour or more that he wandered about the clearing the sound was repeated several times at irregular intervals. This was almost his first venture into our Canadian woodlands, and you are welcome to your laugh when we tell you he had never heard a partridge drum before.

Altogether he found more than a score of strange flowering plants in that enchanted glade, trailing vines and nodding bells, Pyrolas, and Lilies, all common everyday things in the land, but a new world for him of fairy delights in that far-off June; and foremost of these, so familiar now with their tiny green blossoms, ringent, hooded and spurred, were the tall leafy stems and tapering spikes of the Northern Rein-orchid.

VIII. TALL LEAFY WHITE ORCHID

(*Habenaria dilatata*)

NAMES: COMMON: Tall Leafy White Orchid, Tall Northern White, Fragrant White, Lozenge-lip, White-lance. SPECIFIC: *dilatata* (Hooker, from Pursh 1814), "expanded," in reference to the lozenge-widening of the lip-base.

PLANT: STEM: leafy and otherwise like the last, but often slenderer, 12–30 in. high. LEAVES, BRACTS, SPIKES: as in *H. hyperborea.*

FLOWERS: In size, shape of sepals and petals, like the last; but pure waxy white and sweetly clove-scented. LIP: widened at base into rhomboid form, apical half lance-oblong; spur as in the last.

PLACE AND TIME: DISTRIBUTION: Temperate to subarctic America; Labrador to New Jersey in east; across to Alaska, British Columbia, Oregon, and California. HABITAT: wet stations in meadows, bogs, and woods. SOIL PREFERENCE: indifferent. SEASON: late June–early September.

SPECIAL FEATURE: Lip white, rounded at base, lance-oblong above.

THOUGH ranging as far south as New Jersey, the Tall Leafy White, sometimes known as the Fragrant White Bog Orchid, is a true Northerner, like its twin sister the Tall Leafy Green. It is quite the most attractive of all our small-flowered Habenarias, the pure gleaming white of its blossoms being even more conspicuous and no less truly beautiful than the gold of the Yellow Fringeless (*Habenaria integra*) or the flaming orange of the Crested (*Habenaria cristata*). It has, moreover, what many declare the most delicious fragrance of all the orchids—a blending of syringa with cloves.

In appearance, habit, everything except color that the inquiring eye can discern, it is identical with the Leafy Green. But if you set the lips of these two orchids side by side, you will find in the white and fragrant one that the base is widened out (*dilatata*) at the sides into the shape of a lozenge or rhomboid; in the Leafy Green, the lip tapers uniformly from base to tip. This is fortunately a constant difference and serves to distinguish even green forms like *Habenaria media* from *Habenaria hyperborea.*

Plate 33

TALL LEAFY WHITE ORCHID

(*Habenaria dilatata*)

Plate 54

TALL LEAFY WHITE ORCHID

(*Habenaria dilatata*)

Otherwise the Fragrant White is a double of the Tall Leafy Green, and one description serves for both.

It is among the hardiest of orchids, and delights in cold wet bogs of peat and marl, whether open or wooded. In some parts of its range immense plants occur nearly three feet high and very stout-stemmed. It abounds wherever it can find open moist conditions, whether in moss or in turf, among sedges, horsetails or rushes, even in shallow water along with Buckbeans and Bladderworts. No orchid loves better to dig its toes in the ooze and even paddle over the ankles in flood pools. We have seen acres of wet bog, very lightly overgrown with small tamaracs, in which this beautiful white Rein-orchid stood by the thousand along with giant Arrow Grass (*Triglochin*). Quite recently, while making our way round a big marl lake half choked with rush beds, its borders gay with Grass Pink, we waded through great stretches of marsh land filled with this orchid; and fluttering about everywhere among its gleaming white spikes went an army of Swallowtail butterflies of the kind known as Tiger.

Every traveller knows how the heart warms at meeting an old friend in a strange land. More than once we have owed such glad surprise to this "White Bog Orchid." Two or three years ago while camping in the Canadian Rockies we pitched our tent one day in an alpine meadow some 6,500 feet above sea-level. Just west of us stood the great snow-clad sierra of the Ramparts, and as we mounted the springy slope of Maccarib Valley for a glimpse of the Amethyst Lakes, we suddenly came on a wide stretch of snow-white orchids. At a little distance we took them for Ladies' Tresses, but they proved to be a dwarf mountain form of *H. dilatata*. There they stood in the midst of all kinds of strange companions—mountain Gentians, the tiny Bistort, Alpine Spiræa, big plumed heads of Western Anemone, tall claret-colored spikes of Elephant Flower; and there we stood, 3,000 miles away from home, "and gladdened our eyes" with the sight of these familiar old friends of our northeastern bog-lands.

And how fragrant they were! with a more piquant aroma of cloves in their chalice of nectar than we had ever found before.

Again no longer ago than last summer in the lonely depths of a spruce forest north of Lake Superior we had the same glad thrill. Nor shall we soon forget it: we had just made the rarest of all our rare finds in the shape of the Bog Malaxis (*M. paludosa*); and the scene itself was of extraordinary beauty—a floating bog of almost tropical luxuriance, rich in all kinds of rare northern flowers and fairly teeming with *Habenaria dilatata*. On every side of us were floral treasures—Romanzoff's Ladies' Tresses with their almond-sweet spikes of creamy white, Narrow-leaved Sundews (*Dr. linearis*), Spurred Gentians (*Halenia*), Arctic Raspberries with their 6-petalled flowers of mulberry-red, tiny mauve Primroses, golden Bladderworts, and blue Lobelias, all with rival claims to press, but none that for sheer abundance, color-display and fragrance combined, could touch these White Bog Orchids.

We have always counted it a lucky day when we found our pictured group of the Leafy White; eight plants in a space no bigger than a saucer, bog-trotters will all agree, is a very rare sight. Early one June while looking for a good set-up of Queen Lady Slippers, we had discovered a remarkable sanctuary for these royal beauties at the heart of a large wooded swamp. The spot must once have been a circular clearing, though long since obscured by thickets of underbrush and scattered shrubs of cedar and tamarac. Its whole area now formed an ideal little bog full of humps and hollows, sedgy pools, sphagnum mounds, and patches of heath. All round its edges, especially where the old logging roads had entered the clearing, we found quantities of thick gray-green leafy sprouts, the promise of Queen Lady Slippers to be. And here, while plunging excitedly about from point to point, somewhere in the rim of this circle, we ran across a little sheaf of half-grown *Habenaria dilatata*.

Our one desire of the moment being Lady Slippers, we gave the group no more than a passing glance. A week or two later, as

our plans for the summer's pictures took shape, we saw a chance to kill two birds with one stone; and possibly more, for with the advancing season, the spot was proving just about as rich in surprises as a conjuror's hat. But though, among the fifteen kinds of orchid flourishing about our magic ring, we saw plenty of "Tall Leafies" both Green and White, not a trace of this cunning little clump could we find.

The photographer was actually on his knees hard at work with a picture of Big Pink-and-Whites, when our "early explorer" of the tract got a sudden flash of inspiration. North, south, east, or west, the plants had been standing among Grass-of-Parnassus, close to a big water-hole screened with Shrubby Cinquefoil; so, off he sailed on a last voyage of adventure across this uncharted sea of bog-moss and heath. Half an hour later his hurry-call came to our ears from the opposite arc of the circle; and when we arrived on the scene, it was evident he had found the identical spot of his hunch; there he was, stuck fast over the top of his rubber boots in the middle of a bog-hole, facing the daintiest little group of Leafy Whites we have ever had the good luck to discover.

IX. ALASKA ORCHID

(*Habenaria unalascensis*)

NAMES: COMMON: Alaska Orchid, Western Rein-orchid, Piper's Orchid. SPECIFIC: *unalascensis* (S. Watson, from Sprengel, 1826), "from Ounalaska."

PLANT: ROOTS: few, short, fleshy; but including a pair of ovoid, biennial tubers, 5/8 x 1/2 in. STEM: scape-like, sparsely bracted, very slender, 12–20 in. high. LEAVES: in a basal cluster, on long slender petioles, 2–4 in number; obovate to lanceolate, 3–6 in. long; pale green, obscurely reticulate, early withering.

FLOWERS: Numerous, small, green, with sickening odor of stale pollen; crowded into a very narrow, elongated spike. SEPALS: whitish green, lance-ovate, 1/8 in. long; lateral pair spreading, adnate below to sides of lip. PETALS: grass-green, falcate-lanceolate, 1/16 in. long; connivent with upper sepal over column. LIP: yellowish green, blunt lance-ovate, 1/8 in. long; dilated at base, flat, thrust forward and down; floor elevated on median line at entrance to nectary; spur as long as lip, very slender, curved, pointed.

PLACE AND TIME: DISTRIBUTION: Anticosti, P. Q.; Fishing Islands and shore opposite, Lake Huron, Ontario; Rockies west to Alaska and south to California. HABITAT: dry or damp floors of cedar and spruce woods, in moss, gravel, sand or resiny crumble; but often right on limestone flats. SOIL PREFERENCE: probably neutral. SEASON: July–August, occasionally, June and September.

SPECIAL FEATURE: Leaves basal, *several.*

To discover so rare a plant as the Alaska Orchid within a day's motoring distance of home sounds too good to be true. There are but two stations for it east of the Rockies, and one of these is the island of Anticosti. Fortunately for us the other lies close to the Bruce Peninsula in Lake Huron. And so it came about that, dividing our forces, we rounded up in two simultaneous three-day bursts, Small's Twayblade and the Crested Coral Root down in the south, the Broad-leaved Twayblade and the Alaska Orchid up north.

Our portraits, helped out by the introductory key, make a pen-picture of this singular-looking plant unnecessary. It is as if you were to draw out a stem of the Tall Leafy Green to the slimness of the Crane-fly orchid, reduce its flowers proportionately, strip off the stem-foliage and replace it by a basal cluster of three or four leaves from *Habenaria obtusata*, attach a pair of tubers below among the roots, and then inject into the blossoms a sickening odor of stale pollen; this done, you would have a very fair imitation of the Alaska Orchid. The tiny green blossoms are noticeably flattened above and below, and the perianth-parts, as in the Crane-fly, are apt to be unsymmetrical—warped out of alignment. Finally—a saving grace!—the fetid odor has a very short range, only an inch or two.

It was in June, 1925, that we discovered this plant. Relying on a record of fifty years before, we hired an old sail-boat equipped with a Cadillac engine and set out for a cruise—by motor. To the skipper's inquiries which of the hundred-odd Fishing Islands he should steer for, we answered off-hand—"the largest, most heavily wooded, least frequented of all." Away we went, or

Plate 33

ALASKA ORCHID

(*Habenaria unalascensis*)

Plate 36

ALASKA ORCHID

(*Habenaria unalascensis*)

rather, we didn't! Never had we seen a Cadillac that took so much cranking. But at last we got under way, the chauffeur stepped on the gas, and presently we drew up in a small cove alongside the island of our choice. In ten minutes we hit upon a blind old trail that cut across the island through a quarter mile of dense spruce woods, and here we met the Alaska Orchid. The plants were only in bud, and we were on the eve of a trip to the Rockies. So we arranged a foursome for July, 1926, with Owen Sound as headquarters. Most of the brotherhood are well aware that this district is famed far and wide for its ferns. Where else could you find in such luxuriance, or at all, the Holly Fern and the Male Fern, the Green as well as the Black Spleenwort, the Purple Cliff Brake and the Slender, the Walking Leaf and, side by side with it, its rarest of kinsmen, the famous Hart's Tongue? And to crown the wonder add, if you please, a fighting chance of the Oregon Cliff Brake (*Pellæa densa*), the Parsley Fern, and the Wall Rue, all three of which the region can claim. No wonder we arrived at our tryst next season ahead of time!

And then the very day before we were to set out for the Fishing Islands, if the photographer didn't discover, all to himself as it were, a colony of this identical plant on the mainland! It had been found further down the coast some twenty-five years before, but never at this point; and the shout of his discovery brought us on the double to the spot. There it was beyond question, the Alaska Orchid, growing in a more or less exposed situation beside a fringe of trailing juniper; and not only were the flowers in full bloom, but the cluster of basal leaves actually beginning to fade; either they were away ahead of the island colony, or we had made some fatal blunder.

We could hardly wait for the next day to dawn; but when it did, the auspices were all of the best, from the family of four young mink that trailed across the road in front of our car, to the sandpiper that we flushed from her nest of four eggs as we clambered up the limestone ledges back of our island cove.

Plate 37

ALASKA ORCHID

(*Habenaria unalascensis*)

We had come by way of Oliphant so as to strike the Huron shore at a new point, and it proved if possible even richer than Sauble Beach and Red Bay to the south and north; there were the same fascinating stretches of wooded swamp along the shore, the same rich open bogs on the beach; and as we drove the car up the surf-beaten sands, the whole landward side of us was gay with flowers—Blue Bells, Orange Lilies, Painted Cup, Golden Ragwort, Gmelin's Puccoon, Spiked Lobelia, Pitcher Plants, Pogonia, Calopogon; even small things far less conspicuous, we were able to recognize by some familiar trait—long lines of Narrow-leaved Sundew glistening like dewdrops, Fringed Houstonia, Butterwort, even yellow-green patches of Creeping Selaginella.

We knew our island path so well by this time that in less than five minutes from landing we had reached the spot where the trail goes blind and were seated on the windfall of spruce from which we had spied our first spikes of Alaska Orchid. They were in prime condition, and owing to the more favorable cover showed no signs—even the most advanced of them—of yellowing leaves.

The limestone flats of which the island is composed were overlaid here with a wood floor of resiny coniferous crumble, fairly dry and well shaded, rich with moss and other plants that love the evergreens. The timber was mostly spruce of medium size, but with a fair proportion of pine, cedar and balsam; along the edges of the occasional glades were thickets of Creeping Savin, a very beautiful shrub that sometimes entirely covered the limestone floors of these open spaces. Among the plant companions of our Alaska Orchid, besides Twin-flower, Bunchberry, and innumerable seedlings of Shrubby Cinquefoil, we noticed Philadelphia Lilies and Zygadenus, Yellow Lady Slippers, "Northern" Rein-orchids, Menzies' and the Creeping Rattlesnake Plantains, Early and Striped Coral Roots, both in full flower at the time (July 13th); we saw no trace of the Large Coral Root, though it was abundant on the mainland, but the Striped was very plenti-

ful and made a glorious show in the woods when the sunlight fell on its blossoms.

The Alaska Orchid was most abundant under the spruces a few yards in from the path, occupying a shallow soil of moss-covered leaf-mould above the limestone, a situation decidedly dry but well-shaded; there were some fifteen plants in the colony. A little further on in a long low trough, damp and mossy, probably marking a fault in the rock strata, we found a second colony; and up the little slope, on the surface of a big limestone saddleback, especially round its margins, were several more groups. Occasionally it ventured out in the sunlight beyond the friendly shelter of the evergreens, but always anchored in moss or resiny crumble. Some of the largest plants we saw were growing in the open like this; one of them, occupying a shallow saucer filled with moss and mould, had vines of Twinflower trailing over the rock beside it, as pretty a setting as you could wish to see. At its base was a cluster of 4 leaves, all but the smallest of them much like the foliage of *Habenaria obtusata* in size and shape; the stem stood 20 in. high, half of it a slender bracted scape and half a tapering flower-spike set with 59 tiny green flat-heads of blossom, scattered and distant below but crowded above, so small and so sessile as to make the spike a very rapier for thinness. Such was the Alaska Orchid as we saw it in the Fishing Islands, its half-way house between Anticosti and the Rockies.

X. BLUNT-LEAF ORCHID

(*Habenaria obtusata*)

NAMES: COMMON: Blunt-leaf Orchid, Small Northern Bog Orchid, One-leaf Rein-orchid. SPECIFIC: *obtusata* (Pursh, 1814), "blunt"—referring to the leaf.

PLANT: Slender, 4-angled; 3–10 in. high; scape usually bractless, 1-leafed at base. LEAVES: solitary, stalked, obovate to spatulate, 2–5 in. long. SPIKE: bracted, loose, few-flowered, 1–2½ in. long.

FLOWERS: Greenish white, barely ½ in. high, 3–15 in number. SEPALS: green, 1/6–1/5 in. long; upper one rounded, ascending to erect, lateral pair lance-oblong and strongly reflexed. PETALS: somewhat similar to sepals, but shorter and paler, dilated at base on lower margin, set up on edge and pointing forward and up at sides of flower beneath upper sepal. LIP: pale greenish white, lance-linear, deflexed, 1/5–¼ in. long; spur, slender, pointed, somewhat curving, as long as lip.

PLACE AND TIME: DISTRIBUTION: Labrador to Alaska in the north; south to Massachusetts and New York in east, west to Wyoming and Colorado. HABITAT: cool mossy bogs and moist woods under evergreens. SOIL PREFERENCE: apparently rather indifferent, little to moderate acidity. SEASON: mid-June–August.

SPECIAL FEATURE: Leaves basal, one.

THE Blunt-leaf is the smallest of all the Habenarias and also the hardiest. It loves the cold north and the rigor of the glacial fir forest. In this it greatly resembles the Tall Leafy Green (*H. hyperborea*); as the two are frequent companions and have almost the same range geographically, the Blunt-leaf is sometimes called by the appropriate name of "Small Northern."

The stem is from 4 to 8 or 10 in. high, and has a single obovate leaf, rising fairly erect from the base and blunt-tipped (*obtusata*). At the top of the slender naked scape stands a loose spike of fair-sized greenish-white blossoms. The lip of the flower is long, narrow and deflexed, about the same length as the tapering spur. The upper sepal is broad and round; the lateral pair are narrowly oblong; and so are the petals, which have their base dilated and adnate to the column.

The favorite home of this little orchid is in the shady depths of cold wet cedar and spruce swamps; it usually prefers a mossy

Plate 38

BLUNT-LEAF ORCHID

(*Habenaria obtusata*)

floor to bare leaf mould. In many of its chosen haunts we have seen it with the White Adder's Mouth and the Large Round-leaved Orchid. No sooner has it found agreeable quarters than it spreads rapidly throughout the entire area. The tiniest plants seem able to bloom successfully, ripening their seed-capsules when only three or four inches high and so nearly seedlings themselves that perhaps two blossoms in all is the tale of their flower-spike.

We are not likely to forget our first meeting with this orchid, because of a curious encounter that followed hard on its heels. It was a broiling day of August, and the grassy bank confronting us as we emerged from an old cedar swamp was a glory of Golden Rod. Its plumes, one of us noticed, were crowded with little Ground Beetles—very prettily marked—of a kind he had never seen before. So drawing a cyanide jar from his pocket, he proceeded to collect two or three score of specimens. Suddenly the bottle began to fill with smoke. Our entomologist has his faults, but he has also their virtues: he is grossly ignorant of chemistry. Of course it wasn't the cyanide, but a rapid-fire fusillade from the ambushed beetles, a species of bombardier. These creatures when pursued discharge a malodorous liquid which vaporizes on contact with the air. Some of the larger kinds carry ammunition enough to fire four or five shots in rapid succession; and with such vigor as to be audible even to the human ear.

This orchid has proved a regular "hoodoo" for the camera, worse even than the Bracted. It never seems to look natural in a picture, even when the set-up has been good. Our first attempt was made in some cedar thickets at the very heart of a rich peat bog. Here we found a score of plants grouped together in a small moss-tray of a hollow. So densely were they shaded that only at high noon did the sun get a peep at them, and the resulting pictures were a woful disappointment. In a spruce bog where we tried again next day, our luck was no better. At the fourth failure the photographer "baulked on the beast" for the rest of the season. But that only made matters worse. Wherever we went

with the camera, the Blunt-leaf was there before us; it would leer at us from the thickets as we hurried by or even stand out on the open trail and defy us. At last it actually cropped up beside a group of White Adder's Mouth, just as the camera was being trained on them; and then, if the photographer didn't turn round and accuse us of planting it there!

One saving grace the Blunt-leaf never lacks—a delightful setting. The shaded mossy dells that it loves are not only beautiful in themselves but nearly always rich cover for orchids. Scores of such charming nooks are pictured in our memory but none can compare with "Grassy Lake," for its setting included a whole new region never before explored and an all-day tramp brimful of adventure.

"Grassy Lake" lies in the midst of a wild and rugged scene just north of Lake Superior; and the mere name is enough to send our thoughts homing back to the day and the trail of its first discovery. In less than an hour we found good things enough—new plants and enticing cover—to last us a month: Spurred Gentian, White Potentilla, White Mulberry (Salmon Berry), and most surprising of all, White Painted Cup; a wall of shaded cliffs, where tufts of Alpine Woodsia—the first we had ever seen—filled the crannies and fissures, where delicate fronds of Slender Cliff Brake overflowed the ledges in cascades of living green, and what Hooker well declares the most beautiful of all our *Aspidia*, the Fragrant Shield Fern grew in wonderful luxuriance.

Another half-mile, and plunging down a moose trail through the densest of thickets, to our utter surprise we suddenly came out on the edge of an unsuspected lake. At either end was a big stretch of floating muskeg, remarkably rich in bog-flowers of a typically northern sort. The foot of the lake was mossy and dotted about with scattered trees; here we found thousands of little mauve Primulas, Grass-of-Parnassus, Horned Bladderwort, Narrow-leaved Sundew, and the richly colored, quaint, six-parted blos-

soms of Arctic Raspberry. The other end was entirely grown up with tall stems of grass and sedge—a floating meadow as level-topped as a wheat field. And all about among this ever-unharvested hay were sweet-scented spikes of Leafy Whites and Hooded Tresses.

As we were about to re-enter the woods at the upper corner of the lake, we discovered two plants of Blunt-leaf growing right in the open. They were so large and sturdy that at first we took them for *Habenaria hyperborea;* and behold! when we came to examine them, they had each *two* fully developed leaves near the base. This form of throw-back is always full of interest; it sets beyond dispute the descent of *Habenaria obtusata* from leafy ancestors. As if to point the argument, in the thickets of spruce and cedar where the parent colonies lay, we found several bract-bearing stems among the normal naked scapes.

But the most striking feature of all about the station was the vigor of its growth. Nothing had astonished us more throughout the trip than to note how luxuriant all the typically northern plants were: tufted stems of Alpine Woodsia 6 inches long, masses of Fragrant Shield Fern, Club Mosses by the acre bristling with fruit, beautiful beds of Rattlesnake Plantain, both Creeping and Tessellated; the orchids and other flowers of the floating bogs; and now, this wood-floor under the evergreens.

Once or twice as we wandered about, we came upon sturdy clumps of Large-flowered Coral Root; and scattered all over the grove were scores of great Heart-leaved Twayblades, one a giant that stood 12 inches high. But even these and all that had gone before were nothing to the Blunt-leaf Orchids themselves. We had never seen such a sight, big robust plants, growing not by scores but by hundreds, and often in solid beds; there were colonies everywhere. No wonder Grassy Lake and its bordering woods for us mean Blunt leaf Orchid, and will to the end of the chapter.

XI. HOOKER'S ORCHID

(*Habenaria Hookeri*)

NAMES: COMMON: Hooker's Orchid, Hooker's Rein-orchid, Hooker's Round-leaves. SPECIFIC: *Hookeri* (Torrey ex A. Gray, 1835), "Hooker's."

PLANT: SCAPE: 8–15 in. high, usually bractless. LEAVES: two, basal, oval to round, 3–5 in. long; fleshy, shining, spread flat on ground. SPIKE: loose, 4–8 in. long, 1–1½ in. wide.

FLOWERS: numerous, yellowish green, more or less erect. SEPALS: greenish, lanceolate, ⅓ in. long; upper one widened at base, sharp tip deflected; lateral pair strongly reflexed. PETALS: narrower, lance-linear to awl-shaped, connivent under upper sepal. LIP: lanceolate, acute, ⅓–½ in. long, boldly upcurved; spur, nearly 1 in. long, equalling the ovary; slender, tapering uniformly to a sharp point, and directed downward.

PLACE AND TIME: DISTRIBUTION: Maritime Provinces and New England, south to Pennsylvania, west to Ontario and Mississippi Valley. HABITAT: damp to dry rich woods—usually deciduous, often under beech and maple, occasionally near hemlocks. SOIL PREFERENCE: sub-acid; as rare in limestone regions as the Pink Moccasin. SEASON: Late May–July.

SPECIAL FEATURE: Lip and spur tapering uniformly to a sharp point.

By its lily-pad leaves at the base, Hooker's Orchid can be told at a glance from most of its fellows. Indeed, though "twayblades" are quite a fashion among orchids, there is only one other, the Large Round-leaved, that spreads them out flat on the ground like a pair of web feet. Hooker's is the smaller plant of the two and apparently less robust. It has not nearly so wide a range and flourishes more to the south.

It is remarkably local in its occurrence, unknown in one district, plentiful in the next, without apparent rhyme or reason. Our partners in New York State call it common; and that is the report we get of it from Ottawa. Our own local record is five small colonies in twenty-five years. But we don't complain. Its big sister, the Large Round-leaved, is abundant in most of our bogs, and every time we come upon Hooker's, we get a genuine thrill of delight.

The plant stands, as a rule, about a foot high, the stout naked

Plate 30

HOOKER'S ORCHID

(*Habenaria Hookeri*)

Plate 30

HOOKER'S ORCHID

(*Habenaria Hookeri*)

scape rising erect from between the basal leaves and topped with a rather narrow spike of long-spurred blossoms. The leaves are nearly round, and about 4 inches across at their largest. The scape is somewhat angled and "slewed" on its axis so that the flutings trace a spiral course up and down the stem.

The spike contains some 10–20 flowers, scattered rather than crowded, and standing fairly erect on their pedicels. The sepals are wide lanceolate, the lateral pair spreading, the upper one projecting forward in a low arch and sharply deflected at the tip. The pair of petals are narrower and connivent with the upper sepal in a hood. The lip is lanceolate, sharp-pointed, and boldly upcurved, opposing the upper sepal. Its spur is about 1 in. long, uniformly tapering to a point and directed downward.

Like the Large Round-leaved it is distinctly a woodland orchid; but it usually avoids the low wet swamp thickets where *Habenaria orbiculata* abounds. In some districts both plants are found together, occupying damp wood floors and blooming at much the same season. But in Ontario, Hooker's matures about the middle of June, some three weeks earlier than the Large Round-leaved. Its favorite haunt is rich deciduous woods, clean-floored, fairly open and dry. Its commonest orchid companions in our experience are the Showy Orchis, the Bracted, the Downy Rattlesnake Plantain, and the Large Coral Root.

We owe our first find of Hooker's to the Grass of Parnassus. This favorite flower of our childhood we had never seen in Canada till we first came to live at Port Hope in Central Ontario. Here in our very first season, while questing about for wild flowers along a little-used railway track, we came upon a big bed of these beautiful flowers; and tracing to their source the springs that fed them, we found ourselves in the heart of one of the richest woods in the district.

It was early the following June that we made our discovery of Hooker's and it needed no more than a glance to tell us that our long search was ended at last. We had seen so many hundreds of

the Large Round-leaved that there could be no mistake about our new find. The comparatively dry, open woodland glade by itself in this region was good evidence, and the appearance of the plant was better—the olive-green tinge, the naked scape, the narrower spike, and the set of the blossoms.

In these early days of bog-trotting we coined the phrase—"Hooker's hooks" for the earmark that is perhaps the best "identity tag" this orchid has: the pair of bold curves, convex and concave, in which the upper sepal and the lip oppose each other like widely distended open jaws. This feature is well brought out by the camera; as is, also, the tendency of the lip to be wavy toward the apex. The lip is very compactly folded in the bud, and when the flower opens, which it does with surprising suddenness, almost literally "bursting" into bloom, the long lip fairly springs out as though released from great pressure; the crease of its folding in the bud often remains as a permanent birth-mark. We have noticed the same thing in *Habenaria nivea.*

In this our very first colony of Hooker's we counted a dozen plants—seven with flowering spikes—scattered about a small plateau near the edge of a deep ravine. They were growing under beeches in a fairly dry floor of leaf mould. Here in Central Ontario this seems to be its favorite habitat. The four or five stations we have found since have all been similar. It is not only scarce in the region, but extremely chary of blooming; some seasons even the leaves fail to make their appearance. It is also very easily discouraged by the growth of underbrush, having a marked fondness for clean-floored open spaces.

Twice in the last few seasons we have had the good fortune to discover this orchid almost on the edge of deep wooded swamps where the Large Round-leaved was abundant. In both these places we have found it just possible at the end of June to compare the last of Hooker's with the first of *Habenaria orbiculata.* In some districts the plants are much more obliging; and only last year while down in New Hampshire visiting the "Three Birds"

(*Triphora trianthophora*), we saw these two Habenarias flowering side by side on the shores of Squam Lake.

No doubt those for whom Hooker's is a familiar orchid will be ready enough to laugh at any one wasting enthusiasm over so ordinary a plant. But try the shoe on the other foot. Where we have hunted in vain for a glimpse of *Habenaria Hookeri*, such rarities as Striped Coral Roots, Ram's Heads and the Little Round-leaf Orchis, are common every-day sights; and wouldn't you eagerly go a long day's journey and more to clap eyes on one of these?

Only last June when the four of us drove to a rich wood south of Rochester where Putty Roots were out in flower, we saw, along with Yellow Lady Slippers and the Showy Orchis, scores of plants of Hooker's. Never before had we northerners seen such a sight and it proved not a little embarrassing; again and again our attention was distracted from the much rarer *Aplectrum* by these handsome Rein-orchids displaying their web-foot twayblades and spires of spurred blossoms all about the grove.

XII. LARGE ROUND-LEAVED ORCHID

(*Habenaria orbiculata*)

NAMES: COMMON: Large Round-leaved Orchid, Large Round-leaves, Moon-set. SPECIFIC: *orbiculata* (Pursh, 1814), "round," of the leaves; form, *macrophylla* (sp. Goldie, 1822), "long-leaved," larger in every way.

PLANT: SCAPE: 1-2 ft. high, stout, bracted. LEAVES: 2, basal, ovate to round, 4–7 in. in diameter, flat-spread, bright green above, silvery beneath. SPIKE: loose, wide, 1½–2½ in. across.

FLOWERS: Whitish green. SEPALS: upper one, short, rounded; lateral pair, reflexed, falcate-ovate, ⅓ in. or more in length. PETALS: shorter than sepals, lanceolate. LIP: oblong-linear, blunt, ⅔–⅘ in. long, directed downward; spur, clavellate, ⅗–1½ in. long, slung transversely, upcurved toward the tip.

PLACE AND TIME: DISTRIBUTION: Transcontinental; Labrador and Newfoundland to mountains of South Carolina in east; west to Alaska, British Columbia, and Washington. HABITAT: swamps and rich damp woods, espe-

cially under evergreens. Soil Preference: strongly acid-loving, sphagnum bogs, etc. Season: July and August, sometimes late June.

SPECIAL FEATURE: Lip oblong, spur clavellate.

Few will ever forget their first sight of the Large Round-leaved Orchid. It is a handsome plant of very striking appearance. In most regions, too, it is uncommon enough to bring back, at each fresh encounter, the thrill of early days. Many years ago, when very few orchids were known to us and only one other *Habenaria*, we discovered our first plant of it. In our mind's eye we can see it still quite plainly. It was growing, rather unusually, in a "sugar bush" close to the base of a big bass-wood, and from end to end of the cover just this one solitary specimen was to be found. There was intense excitement, long-drawn-out through two weeks and more, as we watched the compact little spear point between the leaves rise up on its tall shaft and spread out into a big blade of many barbs.

Mature plants of this orchid differ so widely in size that recent botanists are disposed to give specific value to the largest under the name of *Habenaria macrophylla*. For convenience of treatment we include all forms, irrespective of size, under the head of *Habenaria orbiculata*.

Including its 3 or 4 inches of flowering spike, the full-grown plant ranges in height from one to two feet. The pair of leaves at the base are almost circular and spread out flat; they attain a great size—occasionally even 8 or 9 inches in diameter, like dinner plates! Between them rises a stout fleshy scape with 1 or 2, frequently several, bracts upon it and surmounted by a loose spreading raceme of very pale green spurred flowers. The spur is very long, sometimes 1½ inches, and club-thickened toward the outer end; the lip is also greatly elongated—three times the length of the side petals—and often appears awkward, like the lip of the Showy Orchis or the Bracted. The lateral parts of the flower are oval and somewhat sickle-shaped; the upper sepal is almost round.

Plate 41

LARGE ROUND-LEAVED ORCHID

(*Habenaria orbiculata*)

Plate 42

LARGE ROUND-LEAVED ORCHID

(*Habenaria orbiculata*)

The flower is really very different from that of Hooker's. The parts of the perianth are blunt-pointed and wider; the lip is blunt oblong, not lanceolate; and its spur instead of being awl-shaped is club-thickened and tip-tilted toward the apex. The poise, too, is quite distinctive. In both, the lip and spur strike a kind of mutual balance. In Hooker's the lip is boldly upcurved and has the spur deflected; in the Large Round-leaved it is the lip that points down while the spur is tilted into a horizontal position.

Though sometimes found in low hardwoods, this orchid much prefers wet thickets of evergreen and the deep shade of swamp cover. In a neighboring bog where we have seen it occasionally, it grows under arbor-vitæs where the floor is damp and clean, almost bare of other vegetation. Occasionally it springs up, from windblown seed, in the open among shrubberies of Labrador Tea and American Laurel, rooting in peat or even sphagnum and intrenched on the north edge of tamarac and spruce stands where the sun hardly penetrates—rich, moist, shady stations.

It is by no means prolific, but the habitual bog-trotter will occasionally have the thrill of meeting with a large colony, where an extensive thicket or wood floor offers just the right cover. In the golden days when every season brought its lapful of fresh discoveries we remember one such spot: a densely shaded old cedar swamp; the floor for the most part a tangle of spreading ground yew and fallen trees, or strewn with crumbling moss-grown logs. Here the Large Round-leaved Orchid was very abundant, along with Twinflower and Moneses; the only other orchid near it was the Blunt-leaf (*Habenaria obtusata*).

Quite recently while roaming the wooded shores of Clear Lake in the Kawartha District, we came upon an even richer "plot" of the Large Round-leaved. A concourse of springs flow down the wet slopes through dense thickets of hemlock, spruce and cedar. Where the floor is boggy and treacherous, patched with lichen and moss, a large and flourishing colony of *H. orbiculata* has established itself. And several of their fellows have staked claims in the near

neighborhood: *H. hyperborea, H. obtusata, Ep. ophioides, Ep. tesselata, Cor. trifida, C. maculata, C. striata.*

The finest colony we have ever seen is beside the little woodland lake mentioned in our chapter on the Pink Moccasin. The plant is to be found here and there in the cedar fringes all about the lake margin, but only in the grove of tall thrifty cedars at the foot is it abundant. Here it has spread widely over the clean smooth floor, and plants of all ages may be observed. Like Hooker's and the Rattlesnake Plantains it is far from free-blooming; in most colonies more than half the plants send up no flowering spike. Close observation reveals what is, of course, the fact, that the leaves are not a pair, nor opposite. The youngest plants have but one leaf, and if you inspect the "leaf-pair" of any older plant, you will find that one is larger than the other and grows nearer the base.

These immense fleshy leaves must be a regular storehouse of food for the plant, and are evidently vital to it from birth. One October lately, while examining a colony of *Habenaria orbiculata*, we found, under cover of the plant's still green leaves, the big fleshy sprouts of next year's growth projecting out of the ground and already green at the tip, sprouts that measured 2 in. in length and half an inch through. These "spear-points," safely sheltered under the old foliage, are actually the new leaves, tightly wrapped about the growing tip of next year's scape; and destined at the year's awakening to unfold and display the budding inflorescence at the heart of them.

XIII. CRESTED ORCHID

(*Habenaria cristata*)

NAMES: COMMON: Crested Orchid, Orange-crest, Crest-fringed Orchid. SPECIFIC: *cristata* (R. Brown, from Michaux, 1803), "crested," of the exposed fringed petal-tips.

PLANT: STEM: leafy below, bracted above, 8–24 in. high, angled. LEAVES: 2 or 3 fully developed, 1–6 in. long, lanceolate, clasping, scoop-like, recurved at tip. SPIKE: crowded, compact, cone-shaped to cylindrical, 2–4 in. long, 1¼–1½ in. wide.

FLOWERS: Brilliant orange, ¼ in. wide, parts all incurved and concaved. SEPALS: round-oval, strongly concaved, lateral pair wide-spread. PETALS: narrower, broad-oblong, fringed all round apical half or below; conspicuously protruded from under dome of upper sepal. LIP: ½ in. long, ovate-oblong, copiously fringed; spur slender, nearly straight, 1/6–¼ in. long, shorter by half than ovary.

PLACE AND TIME: DISTRIBUTION: Massachusetts south to Florida, west to Arkansas and Louisiana. HABITAT: moist grassy places, edges of woods and thickets, outer rim of open bogs. SOIL PREFERENCE: strongly acid. SEASON: July in south, August farther north.

SPECIAL FEATURE: Flowers orange, spur half length of ovary.

THE brilliant orange of the Crested Orchid outshines almost everything in the land of flowers. It is a true daughter of the south, and tropic heat glows in its flaming torch. None the less it has made its way up the Atlantic coast from Florida to Pennsylvania and even Massachusetts. In New Jersey, we found it fairly abundant and, for all its exotic beauty, hale enough to take the most adverse season with a smile.

The plant usually stands 12–20 in. high and has quite a sturdy appearance—a leafy stem, fairly stout and angled, surmounted by a dense cone of rich orange inflorescence. The leaves are lanceolate and sharp-pointed, with sides creased steeply up into the form of a scoop; the lowest 5 or 6 in. in length, those above rapidly reduced to bracts.

Long or short, the flower-spike varies little in width. It is compact and crowded with blossoms. The individual flowers are roundish and cup-like in form, little pockets or nests of orange lacework. The sepals are nearly circular and strongly concaved; the lateral pair spread out at right angles to the ovary, the upper one bent forward over the column, none of them so strongly reflexed as the sepals of the Yellow Fringed. The petals are broad-oblong and copiously fringed, sometimes almost to the base. They are not, like those of the Yellow Fringed, concealed under the dome of the upper sepal, but display themselves conspicuously below and beyond its rim. Instead of being long and narrow as in *H. ciliaris*

the lip is ovate, concaved like a tiny rose-petal, and deeply fringed all about its margin; the spur at the base about equals it in length.

This orchid has no fondness for woodland screens; neither does it seek bog-cover. As you would naturally judge from its brilliance, it likes open situations—rich grasslands with a light, often sandy, soil. In Southern New Jersey we saw its flaming torch of blossoms on almost every trip we took: in pastures and hayfields; about the margins of open bogs where Snowy Orchids and Giant Ladies' Tresses abounded; on the edge of thickets and in the dips of grassy woodpaths with Yellow Fringed and White Fringed; among the Pine Barrens, now growing with Pyxies and Sand Myrtle in a patch of moist sphagnum, now sharing a bed of wet sandy gravel with Thread-leaved Sundew, Carolina Club Moss and that tiniest of ferns the Curly Grass (*Schizæa pusilla*).

The colonies were all remarkably small. They never seemed to overrun a wide area, but were apparently content to occupy some favorable nook—usually the outer rim of those marly open saucer-like depressions known in the region as bogs. But one day, to our surprise, we found a saucer nearly all rim and half the rim was Crested Orchid! We counted over two score of plants in a space of twenty yards. And then, at the end of our round, a fence all smothered in catbriars bringing us up short, we remembered there were two sides to it. So had the orchids! Hidden behind that barb-wire screen of smilax were just as many more.

This haunt of the Crested Orchid was a wide piece of grassland bordering on a strip of shrubby bog. The plants appeared to thrive best about midway between the drier prairie-like stretch and the inundated bogland; it was here that they had done nearly all of their spreading. One or two large groups were almost on the edge of the bog among Long-leaved Sundew and Chapman's Club Moss; but most of the plants were growing in firmer sod, scattered somewhat sparsely over a considerable area. The favorite color of these grasslands was evidently orange. By the big bed of reed grass at the entrance we had seen our first blossoms of the

Plate 11

CRESTED ORCHID

(*Habenaria cristata*)

Plate 24

CRESTED ORCHID

(*Habenaria cristata*)

Smooth Orange Milkweed; and where the Crested Orchid grew most abundantly was a large patch of Orange Milkwort.

The whole surroundings were so rich in flowers and the Crested Orchid had so many interesting plant-companions that we shall always think of it in this particular setting. At one spot, as we approached a conspicuous group of the Crested we came upon some of the White Fringed mingled with spikes of Canby's hybrid in lemon and buff—a fine field example of insect cross-pollination. Here and there between bog's edge and upland were pink and white Sabatias, pale blue Lobelias, and Milkworts, orange and rose. Scattered spikes of Slender Ladies' Tresses showed themselves about the grasslands; and when, on the borders of a neighboring oak grove, we discovered the dainty little *Spiranthes Beckii*, it added a touch of glamour to the scene.

It was thanks to a local botanist, that we first got wind of this place and in the very nick of time. Never has an orchid fought our camera so fiercely as the Crested. In 1919, when we first went down to get a picture of it, we were met by a tropical storm with over nine inches of rain in twenty-four hours; more than enough to damp the photographer's ardor, let alone submerging the plants. And now in 1924 our goose came very near being cooked by a prolonged hot spell in July; every spike that we looked at, to the camera's keen eye revealed little touches of black—dead spots in the flame of these meadow torches.

We were ready to throw up our hands in despair, when along came Mr. Otway Brown with word of a surprise in store for us—a sanctuary where the Crested Orchid had escaped the drought. It sounded almost too good to be true; and presently, knapsacks and camera thumping at our backs and hearts beating fast with excitement, an Indian file of four, we were hurrying down the trail: a long and winding footpath that dodged across fields of swamp hay, jumped ditches filled with water, dived into thickets of catbriar and thorns, skirted a marsh-border gay with Hibiscus, and then suddenly brought up in a prairie oasis brimming with flowers.

Here we added two more to our list of Sabatias—the Slender Sea Pink, smallest of its kind, and the Large Marsh Centaury, as big and richly colored as Purple Cosmos. Here, too, we first saw the stout stems and rigid spikes of Downy Lobelia, and the beautiful Smooth Orange Milkweed with its slender leaves and graceful stems crowned with clusters of blood-red blossom.

But who would dally on an orchid trail? All this would keep for the homeward trip. So plunging boldly into the jungle of tall reed-grass just beyond, we fought our way out into a rich piece of open meadow. Half-way across, there suddenly burst on our vision hundreds of brilliant orange heads, flaming up from the grass. Immediately we soared into the seventh heaven, only to come crashing to earth a moment later as the nearest of these dwindled into Orange Milkwort. But not all dwindled; in one direction a score or more kept getting bigger and more flamboyant at every step till we were right among them. There they were, in the very prime of their bloom, dotted about in ones and twos, flaring out at the top of their stiff leafy stems, bright-orange clustered cones of Crested Orchid.

XIV. YELLOW FRINGED ORCHID

(*Habenaria ciliaris*)

NAMES: COMMON: Yellow Fringed Orchid, Orange-fringe, Rattlesnake's Master. SPECIFIC: *ciliaris* (R. Brown, 1813, from Linnæus, 1753), "eyelashed," alluding to the fringed flowers.

PLANT: STEM: 12–30 in. high, leafy below, bracted above. LEAVES: lanceolate, acute, 4–8 in. long. SPIKE: 1–6 in. long, 1½–2½ in. through; densely to loosely many- or few-flowered.

FLOWERS: Deep orange; over ½ in. long, narrow-oblong in appearance owing to strong deflection of sepals. SEPALS: roundish, unequal-sided at base, ⅕–¼ in. across; upper one, thrust forward, strongly convexed, lateral pair, deflexed to sides of ovary. PETALS: narrow-oblong, ⅛ in. in length, toothed at apex, concealed under upper sepal. LIP: ovate-oblong, ⅖–½ in. long, coarsely, often compoundly fringed, body of lip flat; spur, longer than ovary, slender, ⅘–1 in. long.

PLACE AND TIME: DISTRIBUTION: from Florida north to Vermont in the east, west between Texas and Michigan. HABITAT: grassy places, especially in sandy soil, margins of wood, thicket and open bog. SOIL PREFERENCE: strongly acid to sub-acid. SEASON: July–August.

SPECIAL FEATURE: Flowers large, deep orange, spur exceeding ovary.

THE Yellow Fringed is twice as big as the Crested—a strikingly handsome orchid with a spike of rich orange blossoms. It is the only orange-colored orchid native to our northern territory. Actually abundant on Long and Staten Islands, it occurs locally from Massachusetts through northern New York to Michigan. It has even been found in Ontario, near the base of Pelee Point on Lake Erie. All the way down from here to North Carolina and Missouri it shares its extensive range with the White Fringed, often in close companionship. And the extraordinary thing is that in size, shape, and structure—everything but color—these two orchids are identical.

The plant is tall and leafy-stemmed, often more than two feet high, with a flower-spike six inches in length and more than two inches across. Though sometimes bearing a loose or even few-flowered raceme, it has as a rule a dense and crowded inflorescence. The flowers are over half an inch in length and have slender spurs nearly twice as long. They are narrow for their length and somewhat straggling in appearance. This is due to the withdrawal of the lateral parts, the sepals being strongly bent back to the sides of the ovary and the petals hidden under the dome of the upper sepal. What meets the eye is an overarching hood above and a long fringed tongue below. The central body of the lip is narrow-oblong or ovate, and instead of being deeply concaved, like that of the Crested, it is flat.

In color this orchid is hardly so rich and brilliant as the Crested; perhaps because the position of the large ear-like sepals renders them opaque. But the spike has such a wealth of large flowers that it presents a very striking appearance, and in full sunlight nothing can surpass the splendor of the red-gold raceme.

Plate 45

YELLOW FRINGED ORCHID

(*Habenaria ciliaris*)

Like the Crested and the Yellow Fringeless this orchid delights in rich grasslands and the borders of open bogs; it also takes kindly to sunny glades and the edges of thickets, especially where the soil is sandy. Curiously enough, its favorite haunt of all is not of Nature's making; it fairly revels in ditches along the railway.

The structural sameness of these two tongue-fringed orchids, the Yellow and the White, of course proclaims them the very nearest of kin; and some floras—mainly southern—even go so far as to describe the White Fringed as a color variety of the Yellow Fringed. Curiously enough, however, orange—unlike purple—is one of the "fastest" of colors. When you meet with a "pale" form of *Habenaria cristata* or *Habenaria ciliaris*, you may feel fairly confident that it is no sport, but a hybrid. Besides, the range of the two is widely different and in opposite directions. More significant still, in regions where both occur, there is no confusion; like the Large and the Small Whorled Pogonias, they keep apart in separate colonies without intermingling.

Altogether it seems best to regard them as two distinct species. Whatever the secret of their relationship is, we may be quite sure that the color divergence meant a big gain to the plants. If nothing else it has enabled them to push their ancestral conquest of earth's surface some 20 degrees (1,400 miles) between north and south. For the orange ensign, firmly planted, waves triumphant in the Gulf States of Florida and Texas; while under their white flag the hosts of *Habenaria blephariglottis* have secured safe conduct into Newfoundland, Maine, Quebec, and our own Ontario, sending whole armies of occupation into the peat bogs of Northern Muskoka.

It was in New Jersey that we saw this orchid first. Though probably the commonest of eight new orchids that we found there, it was beyond doubt the foremost of them all in our mind from the day we planned the trip till the hour of our arrival at Cape May. It was the color that did it. In Central Ontario, orange Habenarias are about as common as red Ladies' Tresses or blue

Moccasin Flowers; and the idea of seeing our favorite White Fringed garbed in red gold fired our fancy from the start.

Happily enough, as all of us felt, it was no gaily dressed stranger but our old familiar friend that hurried out to greet us as we entered New Jersey. For suddenly as we bowled along headed for Cape May we came full in sight of a great host of White Fringed Orchids on parade in a low meadow adjoining the road. It is always a genuine inspiration to see these large and beautiful flowers growing in profusion—an acre or more. They have a way that is all their own, an air of quiet dignity as they rise up among the tall sedges and grass-stems, with their gracefully loose array of soft snowy blooms. No matter how common a sight this is, it never seems to pall; and orchid lovers will not be surprised but rather envy us our luck, when we say that we piled out forthwith to revel in the meadow among them.

As we were returning to the car, our pilot pointed to a rich grassy spot beside a thicket and remarked casually: "That's just the kind of place for the Yellow Fringed; we saw several colonies last time on our way down." He had seen orange-colored orchids before and could afford to speak of them as if they were dandelions. We hadn't, and though we knew that that was precisely why we were now steering straight for the Cape, our eyes fairly bulged with excitement. Needless to say, we all kept a sharp look-out on board the "Gentle Brute"; but alas! no such strange romantic craft, flying an orange flag, hove in sight that day.

What we were so eager to see, our pilot apparently was anxious at not having seen. For hardly was breakfast over next day before orders were issued to go aboard, and we headed straight for one of the Bennet bogs where *Habenaria ciliaris* had been found on the previous trip. In a quarter of an hour we were standing on the edge of one of New Jersey's famous open grassy bogs—our first experience. Up and down and across we scanned it in vain for the tell-tale ensign. However, there were several acres to be gone over and the tall sedges made a very effective cover. So in we

Plate 46

YELLOW FRINGED ORCHID

(*Habenaria ciliaris*)

Plate 47

YELLOW FRINGED ORCHID
(*Habenaria ciliaris*)

YELLOW FRINGELESS ORCHID
(*Habenaria integra*)

CRESTED ORCHID
(*Habenaria cristata*)

plunged to explore, wading this way and that through the long grass.

Almost at once came a cry—"White Fringed Orchids! What beauties!" But they proved instead to be our first sight of the Snowy Orchid; the bog was full of them. No one, of course, except in New Jersey would ever think of keeping such things in a hay field, but there they were. Still no sign of *Habenaria ciliaris*, though we did presently see *Habenaria blephariglottis;* and when we reached the other end of the bog we were in despair. Five years before there had been plenty of Yellow Fringed about the margins here, and even some spikes of the Crested. Had the long drought of July been too much for them, or was it possible we had come too late?

Not far away stood a great mass of heaths, Sweet Pepper-bush and other shrubs overgrown with trailing vines of a red-flowering pea and Ground Nut or Wild Bean with its rich brown-purple scented blooms. Just as we skirted along the edge of this, there came a sudden gleam of orange from the far side of the thicket, and in we plunged with a shout, wading desperately toward a big colony of Yellow Fringed Orchid, for that's what their size proclaimed them to be. In another second we were floundering helplessly in a tangled mass of living barbed wire, the awful "catbriar" of the south. The whole thicket was penetrated through and through with long strands of it. We learned right there the full import of its name, for pussy's claws dug into our thighs and raked us fore and aft. But no kind of entanglement could hold us long and presently we were in the open at the other side, face to face with our first big spikes of Yellow Fringed Orchid.

XV. WHITE FRINGED ORCHID

(*Habenaria blephariglottis*)

NAMES: COMMON: White Fringed Orchid, White-fringe, Plume-of-Navarre. SPECIFIC: *blephariglottis* (Hooker, 1824, from Willdenow, 1805), "eyebrow-tongued," *i. e.*, fringe-lipped.

PLANT: STEM: 1–2 ft. high, leafy below, bracted above. LEAVES: lanceolate, acute, 4–8 in. long. SPIKE: 3–6 in. long, 1½–2½ in. wide, densely to loosely many-flowered; soft-feathery.

FLOWERS: Pure soft white, not polished. SEPALS: ¼–⅓ in. long, lateral pair roundish, oblique at base, strongly deflected; upper one, round-ovate, nearly erect. PETALS: narrow-oblong to spatulate, cut-toothed at apex, connivent with upper sepal. LIP: ⅖–½ in. long, tongue-shaped, finely fringed, central disc convexed; spur, 1–1⅕ in. long, slender, awl-shaped, exceeding ovary.

PLACE AND TIME: DISTRIBUTION: Newfoundland to Ontario, and throughout our northeastern States, ranging south to North Carolina and west to Michigan and Ohio. HABITAT: Peat lands, bogs, and pine-barrens. SOIL PREFERENCE: strongly acid-loving, abundant with Pink Moccasins and Ragged Fringed. SEASON: July–August.

SPECIAL FEATURE: Flowers white, lip tongue-shaped.

THE White Fringed Orchid is one of the beauties of our peat bogs and very deservedly a general favorite. Few sights are gladder or more inspiring to the orchid hunter than its tall stems and soft feathery plumes of snow-white blossom. Like all the fringed Habenarias, both tongue-lipped and fan-spread, it is peculiar to our northeastern territory. Though found almost as far south as the Gulf, we think of it as typically boreal rather than austral; for it is thoroughly at home with us in the north and occurs in great quantities about some of our peat bogs and lake margins.

So far as known, there is no structural difference between the Yellow Fringed and the White Fringed. Such points as the less crowded spike, smaller flowers, and finer fringe of *Habenaria blephariglottis* are often mere color-effects. The flowers of *Habenaria ciliaris* certainly did look to us coarser-fringed and less regular, the body of the lip linear rather than oval, its lacework

Plate 18

WHITE FRINGED ORCHID

(*Habenaria blephariglottis*)

Plate 49

WHITE FRINGED ORCHID

(*Habenaria blephariglottis*)

of hairs pointing back on the lower half and forward above. But there was nothing we could rely on as constant. In the field, of course, the color-badge is an all-sufficient mark of identity, but dried specimens of the two plants are indistinguishable.

A delightful feature of the White Fringed is the charm of its surroundings. In the warm climate of New Jersey it flourishes in the open, often rooted in moist sand; its white plumes are conspicuous all about the Pine Barrens. But farther north it invariably seeks cover, making its home in the depths of rich peat bogs. Some of its haunts in New England and New York are among the most beautiful you could possibly imagine, carpeted with soft sphagnum and rich with luxuriant fern growth. It is not found under trees, but about winding lanes of moist prairie cover, among tall stems of grass and sedge, in the lee of scattered shrubberies or some inner margin of woods; often where Snake Mouth and Grass Pink abound, budding when these are in full bloom; sometimes with other Habenarias, Moccasins, Listeras, or Ladies' Tresses.

In the open bog of Zurich we met its beautiful white-crowned stems several times between the woods that skirt the swamp and the open tract of heath at the foot of the lake. Here, among sedges and tall cotton grass—and within a stone's throw of the biggest patch of golden Horned Bladderwort we have ever seen—they were sharing a rich somewhat shrubby cover, moist and mossy, with Pogonias, Calopogons, and Ragged Orchids.

In Canada it is described by Macoun as "apparently rare," and we have not ourselves found more than two or three stations for it in the Province of Ontario. But it is very generally distributed, and its lateness of maturing in our climate may partly account for the sparseness of official records. Summer tourists often encounter its beautiful white plumes about the peat bogs of the Muskoka islands and lake shores; and it is abundant in the "Mer Bleue," an extensive tract of rich bog near Ottawa, the only known station in the Dominion for *Listera australis*.

Our own acquaintance with White Fringed Orchids in Ontario is a curious story. Twice in the early days of our hobby we came

upon what with our poor pennyworth of botany we took for *Habenaria blephariglottis*. Then while fern-hunting in North Muskota we got wind of a rich little floating bog where our host had discovered a big bed of ferns "the like of which he had never seen before." Our host was no botanist, but he had a keen eye for nature and loved to roam the woods. So it was soon agreed that his son and he should guide us to Twin Lake the following day. Jim was as delighted as only a schoolboy can be; he was sick of farming just then. Only that morning while trapping woodchucks he had caught a tartar—by the teeth—with his thumb.

All went well till we neared the bush trail, but here we found our wagon road completely under water. Beavers had dammed a small stream farther down and converted the swamp land into a big lagoon. However, the water seemed little more than knee-deep, as long as we didn't side-step off the road into one of the adjoining ditches. But we had lost sight (little wonder!) of the rickety bridge midway that crossed the swamp-stream, and presently our leader vanished into the hole where a log had floated out. For a moment there was consternation; but he bobbed up serenely and resumed his march.

The bush trail led us through a succession of beaver meadows into a big stretch of bog. Here we struck off through scattered tamaracs to a belt of woodland, and presently found ourselves on the margin of Twin Lake, treading gingerly over ground that quaked, among Cranberries, Pitcher Plants and a profusion of Grass Pink and Rose Pogonia.

Near the head of the lake, sure enough, were our ferns, line upon line, standing stiffly erect and all facing one way, their backs toward the shade. They spread this way and that through the sphagnum on long underground runners and threw up their green fronds at intervals into the daylight. The fruit-dots were in the form of hyphens and ran in parallel lines. It was our first sight of the Virginia Chain Fern.

But what were those tall-stemmed Habenarias with big green knobs of bud growing by the hundred right behind the ferns?

They surely couldn't be our old friend the White Fringed, for it only occurred in small colonies, six or eight plants at the most. On opening one of the buds we found a fringed lip indeed, but tongue-shaped, whereas in our previous find the lip had had three fan-spread divisions. Incredible as it may seem, our greenhorn's luck had brought us twice over a sight of *Habenaria leucophæa*, the very rarest of orchids in all our region; and we were only now discovering the much commoner *Habenaria blephariglottis*. This only added to our excitement; it was like finding two new orchids instead of one, Prairie and White Fringed at a single stroke. That day week when Jim and his father trudged stolidly off to the hay-field, we light-hearted vagabonds hiked out to Twin Lake once more for our very first sight of the White Fringed Orchid in open flower.

XVI. RAGGED ORCHID

(*Habenaria lacera*)

NAMES: COMMON: Ragged Orchid, Ragged-fringe, Green-fringe, Russet Orchid. SPECIFIC: *lacera* (Michaux, 1803), "torn"—of the deep-cut fringe.

PLANT: STEM: 1–2 ft. high, leafy below, bracted above. LEAVES: 5–8 in. long, lanceolate. SPIKE: 2–6 in. long, loose, flowers numerous, occasionally few.

FLOWERS: Pale yellowish—or whitish-green, about ¾ in. long. SEPALS: blunt-ovate, lateral pair narrower; ¼ in. long. PETALS: same length, oblong-linear, entire. LIP: irregularly linear-spatulate, tripartite; lateral lobes fringed to base; middle lobe narrow-oblong, dilated at apex into a fringed wedge; spur, ⅗ in. long, curved, clavate, about equalling the ovary.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England south to Virginia, west to Manitoba, Missouri and Alabama. HABITAT: wet open sedgy tracts in swamps, meadows and glades. SOIL PREFERENCE: moderate to strong acid. SEASON: May–June in south, June–August in north.

SPECIAL FEATURE: Lip three-parted, yellowish green, spur equalling ovary.

THE Ragged Orchid serves to introduce a new group of Fringed Habenarias, in which the lip is lobed and bears its fringe in three fan-spread divisions. There are five orchids in the group and as arranged in Gray's "Flora" they form an inverted

climax, beginning with the Ragged, which is all fringe, and ending with the Fringeless.

Though ranging as far south as the Gulf States, it appears to flourish best farther north. An interesting point about it is that it reaches its greatest growth in the east, while its next-of-kin, the Prairie Fringed, like so many of our fellow citizens, has "gone west" in order to prosper. In Michigan we found the Ragged Orchid weak and "spindly," whereas in New England it is large and luxuriant. The old "mowing fields" of Southern Maine are the place to see this plant in perfection. Here, in spite of its protective coloring, it is often a conspicuous feature even from the roadway, some giants being nearly an inch thick at the base and bearing a raceme easily eight inches long.

The plant ranges from one to two feet in height and is leafy-stemmed. The spike is loose and spreading, occasionally crowded. The flowers, few to many, are pale yellow-green or whitish, indistinguishable at a little distance. The sepals are ovate, the lateral pair so strongly reflexed as to lie together pointing down. The petals are linear and entire, and protrude from under the upper sepal. The lip is narrow-oblong, winged at the base with a pair of deeply fringed lobes, dilated at the tip into a sparse fringe, and armed with a curved spur over half an inch long.

There is nothing particularly beautiful about this orchid, and the flowers in color and form alike are quite inconspicuous. But no one will deny that it is interesting in the extreme. The "tattered and torn" shreds into which the three segments of the lip are divided form so curious a feature that the eye reverts to it again and again. The popular name "Ragged" (a translation of *lacera*) could hardly be bettered; it is precisely the stuff of which folk-names are made. Of course the lip is in no sense mutilated; the rags and tatters have all the perfection and symmetry of a living petal.

In Ontario, so far as known, this orchid is limited to the southwestern part of the Province. The single record for it farther east

Plate 50

RAGGED ORCHID

(*Habenaria lacera*)

Plate 31

RAGGED ORCHID

(*Habenaria lacera*)

—"near the hop-yard, Belleville"—is more than half a century old; and alas! neither hop-yard nor ragged neighbor now survive. But while camping early one summer on the north shore of Lake Erie, we found to our delight some plants of it near the base of Point Pelee. This is the most southerly part of our whole Dominion and has a very mild climate. The country is very flat and filled with gay sand-loving flowers like Orange Milkweed, Painted Cup and Hoary Puccoon; even Rafinesque's Cactus spreads its big yellow flowers and spiny green branches out on the sand. Here, too, is the only spot in all Canada where the Yellow Fringed Orchid may sometimes be seen.

Our discovery was made in the heart of a very rich open wood where Turk's Cap Lilies abounded. Though it was only mid June, the Ragged Orchid was out in full flower. The plants were growing in a scattered colony close beside a grassy path among trees of very varied growth, including Chestnut, Sour Gum, Tulip, and Sassafras;—just such a wood as the Broad-leaved Beech Fern loves, neither dense nor wet, but rich and lightly shaded.

The absence of this orchid from our hunting-grounds north of Lake Ontario led to our being beckoned over the water into New York State some seasons ago. The sight of the Ragged in its native haunt was lure enough to draw us down the longest trail that ever was; and presently the four of us were speeding east from Buffalo bound for a famous orchid cover on the other side of Rochester. Here in the first week of July we found *Habenaria lacera* at the very height of its season and just abundant enough to pique our curiosity; we learned to know its looks and ways without ever losing our regard for it.

Its favorite situation was along the margins of fields, often right up against the fence or on the edge of a little runnel or moist border trench. Its absence from all other parts of the meadows and pastures told a sad tale of browsing cattle and the deadly swath of the mower's scythe. What it does when unmolested was very happily illustrated for us last August while motoring through Ver-

mont. As we sped along by a field of unmown meadow grass a flash of bright color caught our eye and we stopped to explore. Magnificent spikes of Small Purple Fringed were dotted about the meadow. And then as we waded through the tall grass from group to group we found scores of plants of the Ragged hidden among the grass stems.

At the New York station where we first observed this orchid in quantity, it was always growing in the open fields. At one spot, to be sure, we found it growing in a fence corner almost on the edge of a wooded swamp exceedingly rich in orchids; a swamp bordered with Purple Fringed and Tubercled, and harboring in its depths such rarities as Helleborine and Nodding Pogonia, to say nothing of Little and Matricary Grape Ferns. But within the cover of this swamp or in any of the rich orchid bogs with which the district abounds we could find no trace of the Ragged.

By a curious chance we had hardly turned our backs on all these field colonies, fairly confident that we understood the yes-and-no of its habitat, when we came face to face with it in the very heart of a deep rich sphagnum bog—no less a place than the famous Zurich mud pond. Not far from the inner edge of the encircling woods below the lake ran a wet mossy stretch with abundant cover of tall sedges; and here, along with White Fringed, in a perfect Paradise of bog plants, flourished this daughter of the meadows, the Ragged Orchid.

XVII. PRAIRIE FRINGED ORCHID

(*Habenaria leucophæa*)

NAMES: COMMON: Prairie Fringed Orchid, Prairie Orchid, Prairie White-fringe. SPECIFIC: *leucophæa* (Nuttall, 1834), "white-looking," "whitish."

PLANT: STEM: 1½–4 ft. high, angled, stout, leafy. LEAVES: lance-oblong, 4–8 in. long. SPIKE: 3–5 in. long, a broad, foamy-white, loosely flowered raceme.

FLOWERS: White, slightly greenish or creamy-tinged, large and fragrant, ¾ in. long. SEPALS: broad ovate, ¼ in. long. PETALS: narrower than sepals, a little longer, cut-toothed. LIP: ⅝–⅔ in. long, tripartite; segments broad wedge-shaped, copiously fringed; spur, 1¼–1½ in. long, somewhat transverse, curving, clavellate, longer than ovary.

PLACE AND TIME: DISTRIBUTION: Nova Scotia and New England, sparingly west through Ontario and New York, to Minnesota, down Mississippi Valley to Lousiana. HABITAT: wet mossy and sedgy spots of rich open bog, meadow and prairie. SOIL PREFERENCE: probably acid, associated with Rose Pogonia and Grass Pink in peat and sphagnum. SEASON: June–July, occasionally August.

SPECIAL FEATURE: Lip three-parted, white, spur exceeding ovary.

THE Prairie Fringed is a glorified form of the Ragged, twice as large, showy, and fragrant. It is known in Canada from Nova Scotia to Ontario, but is nowhere abundant. In the States it has been recorded from Maine and New York, but only very rarely. Its true home is farther west; it luxuriates in moist prairie lands and rich bog cover from Michigan to Minnesota and all the way down the great Mississippi Valley. No other of our Fringed Orchids is found so far west.

The stem is stout and somewhat angled, from 1½ to well over 3 feet in height, and with lanceolate leaves. The spike is 3–5 in. long, very wide and loose. The flowers are not very numerous, 10–20 as a rule. The sepals and petals are wide-oval, the latter minutely toothed. The lip is three-parted, the divisions broadly wedge-shaped and copiously fringed, the pair of basal wings almost as deeply as those of the Ragged; the spur is longer than the ovary, often 1½ in. in length, curved and conspicuously clavate. The flowers are very fragrant with a scent suggestive of elder, and

gleaming white in color. When seen alongside their frequent companion *Habenaria dilatata*, they appear less snowy, as though they had a very delicate creamy tinge; this is partly due to the sepals being rimmed and backed with green.

In our northeastern States, this beautiful orchid is almost extinct. An older generation was able to record it from two or three separate points in New York State, but no one of our day has seen it there, in spite of the most persistent search. The only surviving station we know of is in northernmost Maine. It has been met with occasionally in many parts of Ontario, and a few stations are still known to local enthusiasts and jealously guarded.

You will readily understand that for all four of us the Prairie Fringed represents almost the peak of orchid rarity; and when you reflect further that it is large, handsome, and *quite a possible find*, you will realize that on its trail from first to last we have had all the thrills of sportsmen out after big game. It was (and still is) the ambition of two of us to find this orchid in our own home State, an ambition perhaps unrealizable; and it was the hope of two of us to find it within reach of our partners' camera, a hope not fully realized, for our pictures were taken at Battle Creek, Mich. But there's joy in the chase as well as in the kill; and it certainly has been no end of a chase, over many a season and hundreds of miles.

To begin with, by a piece of greenhorn's luck, we of Ontario had met the Prairie Orchid on *two* separate trails in the very earliest days of our orchid-hunting; and for many a year we had had the supreme pleasure of an annual pilgrimage to its shrine in early July. But like many another greenhorn, we didn't at first know what a prize we had found and, misled by a local key, set it down as *Habenaria blephariglottis*; and so it stood for several seasons.

Both these colonies were in the open heart of rich wet sphagnum bogs, among trailing Cranberry vines, Triglochin, Sundews and Pitcher Plants, Queen Lady Slippers, Fragrant Whites, Arethusas, Grass Pinks and Rose Pogonias. Sometimes when the season was

Plate 52

PRAIRIE FRINGED ORCHID

(*Habenaria leucophæa*)

Plate 53

PRAIRIE FRINGED ORCHID

(*Habenaria leucophæa*)

extra wet we found dainty blossoms of Slender Bladderwort floating on the peaty pools alongside.

Naturally, when North and South entered into friendly alliance a few years ago, one of the very first subjects of discussion was the Prairie Orchid. If we could help our partners to a sight of it, they would come over with their camera. But, alas! our old stations proved to have lost their early richness, both of the colonies had vanished, and we didn't know where to turn for a third. Then our partners got wind of an old record for the Prairie Orchid in "hundreds of acres" on Walpole Island in the Detroit River, and formed a careful plan for rounding it up in their own home State. We were to join them in Buffalo, and together we'd visit the best possibilities known in the State and comb over all the most promising cover. Failing these, we'd fall back on what looked like a sure thing at Walpole Island.

And then at the very close of June, the day before we were to join our partners in New York State, a miracle happened! While wading about in the heart of a huge swamp some forty miles from Peterborough, we suddenly spied the big stout stem of a leafy Habenaria with a spike of great knobby green buds, a strangely familiar sight! It was *Habenaria leucophæa*; there was no mistaking it. In a wet sedgy stretch of a few rods, among Tall Leafy Greens and Fragrant Whites, Queen Lady Slippers, Grass Pinks and Rose Pogonias, we counted 10 plants, at one spot 3 closely grouped, all sturdy and loaded with buds, those at the base just bursting into creamy blossoms. The lost was found! Then we crossed a half-mile of "island," as the knolls in the big Murray bog are called, and descended again into a wide stretch of wet prairie. It was a day of fierce heat, but the cover looked very "likely" and we could see a friendly stand of conifers out in the waste of tall grass. So in we went, and our reward for another hour's grilling was seven more plants of *Habenaria leucophæa* and a handful of luke-warm water scooped up from some sphagnum.

Next day, with this extra trump tucked safely up our sleeve,

we crossed over into New York State and joined our partners in their big-game drive. Together for ten whole days we beat the covers at Spring Lake, at Zurich, at Walpole Island, and found never a trace of the quarry. When we returned to Ontario about mid-July, the last of our seventeen spikes had already withered; and next season, when we all closed in on the cover, there was but one stunted specimen in sight! So then, of course, there was nothing for it but Battle Creek.

It was a glorious trip, chock-full of adventure and ending with a most wonderful display of Prairie Orchid. Of the lively little gophers that popped up to peep at us going by; the ducking we got at the neck of the slough trying to creep out to our very first stem of *Habenaria leucophæa;* the hidden strands of barb-wire that punctured our waders at the entrance to the bog; the Pigmy Massasaugas that we dreaded to meet and never saw end of all day, neither rattle nor fang; the big Black Snake that we did see, and the lusty fight it put up when we noosed and measured its five-foot length; of these and fifty other things we haven't space to tell.

The bog filled one side of a narrow slough, and an open channel of water lipped along its inner edge. It looked like one of our own rich little muskegs,—Poison Sumac *ad lib.*, Heaths, Dwarf Birch, Black Spruce, and, above all, Tamarac. But for "juiciness" and rich vegetation combined, it beat everything we ever saw before. It was gay with beautiful flowers and pitted all over with black peat-pools and squidgy holes—a floating quagmire as fascinating as treacherous. At every turn came reminders of our own earliest meetings with *Habenaria leucophæa*: Cat-tails and Purple Loosestrife; Yellow Pondlilies, White Callas, Arrowheads, and Buckbeans; floating stems of golden Bladderwort, Grass Pinks, and, above all, the Prairie Orchid itself. It was there by the hundred, tall luxuriant stems crowned with great racemes of soft white bloom, deliciously fragrant.

The very best of them all stood right on the brink of the open

channel, quite beyond reach. But even so there were scores of superb stems scattered about among the tamaracs and easy of approach. The picture we carried away in our mind from the bog was of tall-stemmed big feathery heads of white bloom backed with delicate soft-green tamarac foliage. There wanted nothing. It was the Prairie Orchid in its perfect setting.

XVIII. SMALL PURPLE FRINGED ORCHID

(*Habenaria psycodes*)

NAMES: COMMON: Small Purple Fringed Orchid, Butterfly Orchid, Fairy-fringe. SPECIFIC: *psycodes* (Linnæus, 1753), "butterfly-like" (*psychodes*).

PLANT: STEM: 1–3 ft. high, leafy below, bracted above. LEAVES: lance-oval, 2–10 in. long. SPIKE: cone-shaped to cylindrical, usually many-flowered, loose to dense, 2–6 in. long, 1–1½ in. wide.

FLOWERS: Soft mauve or lilac, sometimes white, purplish in bud, fragrant. SEPALS: oval, upper one narrower, ⅓ in. long. PETALS: oblong-spatulate, finely toothed, connivent with upper sepal. LIP: three-parted, spreading, ⅓–½ in. across; segments fan-shaped, copiously fringed; spur, slender, clavellate, longer than ovary, about ⅔ in. in length.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England in east, south to North Carolina, west to Minnesota and Illinois. HABITAT: wet open meadows, swales and shrubby swamp lands. SOIL PREFERENCE: neutral to slightly acid. SEASON: June in south, July–August farther north.

SPECIAL FEATURE: Flowers three-parted, mauve, about ½ in. across.

THE Small Purple Fringed was named by Linnæus for its fancied resemblance to a butterfly (*psyche*). By a slip of the master's pen, the middle letter was dropped from the word *psychodes*; and like good little children we have been spelling it wrong ever since. It ranges much farther west than the Large Purple Fringed, but like all the other members of the group is peculiar to the northeastern quarter of the continent. Its season of blooming is a little later than that of *Habenaria fimbriata*; but it varies quite remarkably with locality, and we have met it in perfect flower over a period of eight weeks.

Plate 54

SMALL PURPLE FRINGED ORCHID

(*Habenaria psycodes*)

It stands anywhere from 1 to 3 ft. in height and is leafy-stemmed. The spike is cylindrical, either loosely few-flowered or crowded to denseness. The sepals are ovate, the lateral pair the wider and strongly recurved as in all this group; the petals are oblong and toothed on the upper edge. The lip is widely 3-parted into wedge-shaped fringed divisions like the leaves of a fan; it is usually about half an inch across and has a slender slightly clavate spur about ⅔ in. long.

The form of the spike is very variable. A loose few-flowered arrangement seems just about as prevalent as a dense and is often the form preferred where the plant is most luxuriant. The range of color is even more remarkable; it is usually a delicate lilac or mauve, but pale pink and rose-red are also found; and in many of its haunts you will occasionally see pure white spikes among the purple and lavender, producing a peculiarly beautiful effect.

No other orchid that we know of keeps quite so many surprises up its sleeve, and this very waywardness lends it a charm. For a number of years after settling in Central Ontario we knew but a single spot where it grew within easy reach of our home. It was very abundant here, and as variable in size, form, and color, as Proteus himself. In one thing only was it constant: it never flowered till the end of July. And then one season, following the trail of the Tubercled Orchid some forty miles farther north, we found colony after colony of Small Purple Fringed out in full flower the last week of June.

Though often growing in rich moist mowing fields companioned with Ragged Fringed, it is fondest of beaver meadows and wet river thickets where Tubercled and Tall Leafy Greens abound; here you will usually find it, half hidden in bowers of grass and other herbage, screened among bushes, or wandering down the winding alleyways of scattered shrubbery. But it wouldn't be the Butterfly Orchid, if it didn't elude you once in a while; in many a district where suitable and even ideal conditions seemed to prevail, we have searched the likeliest-looking covers in vain.

For many, perhaps, it has lost its charm, a flower too often seen to be noticed. None the less it makes a lovely mass of bloom and the individual blossoms are beautiful to the last detail. Clustered like a swarm of butterflies with fretted wings of mauve, they make a dainty show on their leafy perch. Though the flowering-head is large, it is curiously inconspicuous in its shadow-checkered bower of green and fades out of sight at a few yards' distance. Common as it is and often, like the White Fringed, to be counted by the thousand, it is a great favorite of ours; and the sight of it season after season never fails to recall vividly our first meeting with its soft mauve spires.

We had been fern-hunting along the banks of a stream not far from the Rideau, when we discovered a most delightful little beaver meadow hidden away among the woods. The approach to it lay through a limestone gorge filled with all kinds of rock ferns; and in or about the meadow itself we more than doubled our finds. Its surface was covered with tall sedges, feathery grasses, meadow-rue and anemone, scattered shrubs of willow, red osier dogwood, and spiræa. At one of the little "oxbow" bends of the stream that meandered through it, where a sloping pasture came suddenly down to its margin, Marguerites and Black-eyed Susans met and almost mingled with Bur Marigolds and Cardinal Flowers.

But it was none of these that kept us wandering about the little beaver meadow and up and down the banks of the stream, lingering on through the long afternoon till the woods on all sides were a-throb with the call of the whip-poor-will. It was scores upon scores of those fairy wands of bloom that we call Purple Fringed Orchids. The great heads of delicate inflorescence, solid yet soft, seemed somehow more wonderful than any single triumph of Turk's Cap Lily or Lady Slipper. How beautiful they were, how endlessly varied! now crowded into a compact cone, now spread in a loose and scattered raceme, from crimson to the palest lilac and mauve, delicate lavender, and even pure white.

Never had we seen them before, and never have they made a greater impression upon us; it was not their beauty alone and profusion, but the charm of their setting. Dainty and fastidious as the Purple Fringed are in their choice of a home, their feeling is all for the hidden spring, and not for the landscape beyond. But here they were the crowning glory of a lovely little scene.

XIX. LARGE PURPLE FRINGED ORCHID

(*Habenaria fimbriata*)

NAMES: COMMON: Large Purple Fringed, Large Butterfly Orchid, Plume-royal. SPECIFIC: *fimbriata* (Dryander, 1789), "fringed."

PLANT: STEM: 1–5 ft. high, stout, leafy. LEAVES: 4–10 in. long, lance-oval, rapidly reduced to bracts above. SPIKE: 3–15 in. long, 1½–2½ in. wide; as a rule, loosely flowered.

FLOWERS: Lilac to white, fragrant. SEPALS: ovate, upper one erect, connivent with pair of petals. PETALS: lance-oblong, finely toothed. LIP: ½–1 in. or more across, 3-parted, segments broad fan-shaped, copiously fringed; spur, 1–1½ in. long, clavellate, slender.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England, south to North Carolina, west to Ontario and New York. HABITAT: rich moist meadows, marshy borders, wet deciduous woods; frequent among the mountains. SOIL PREFERENCE: fond of medium to strong acidity. SEASON: mid-June–August.

SPECIAL FEATURE: Spike and flowers much larger than those of *H. psycodes*.

THE Large Purple Fringed, like the Ragged, appears to reach perfection in the northeast corner of its range. It is so much larger there than the Butterfly Orchid that the two can hardly even be compared, let alone confused. It is frequent throughout our "Highland" region, from the Adirondacks to the White Mountains; Thoreau remarked on its abundance in the woods of Maine; and we can ourselves speak for its prodigious luxuriance in parts of New Brunswick and Nova Scotia.

If this great orchid is only a peculiarly favored race of *H.*

LARGE PURPLE FRINGED ORCHID

(*Habenaria fimbriata*)

psycodes as the older botanists held, it is certainly a race of giants that in fullest growth can never be mistaken. True, there is little or no structural difference to separate it; the greater divergence of the anther cells, the denticulation of the petals continued down their lateral margins as well as on the apex, even the looser more spreading habit of raceme so often found, are distinctions that tend to disappear where both forms are much of a size. The most convincing argument, after all, is to see the plant at its biggest. It sometimes stands five feet high, the stem as thick as a man's finger, the raceme enormous, and the individual flowers more than an inch across.

Its chosen home is open wet woods and meadows. You will often meet it in mountain haunts, but it is a true naiad after all. No orchid loves better to dabble its toes in the water, especially the cool trickle of fresh springs and marshy brook borders. Where it shares the same district with the Small Purpled Fringed, it is noticeably the earlier to bloom.

For two of us the Large Purple Fringed will always bring memories of our first trip through the beautiful mountain scenery of New England. The picturesqueness and charm of these wooded Highlands were a perfect revelation. Rather than leave it all behind on our way home, we swung south to the tail end of Lake Champlain and stole a day in the Adirondacks.

We were in a peculiar state to enjoy it all, having just crowned with success a week's hard search for the Bog Malaxis and being now on the way to see the "Three Birds" bloom in New Hampshire. Our approach lay through the Green Mountains of Vermont: hills on all sides in endless variety, valleys forking and branching in every direction. Up and down, in and out, through the heart of it all, wound our road, climbing through dark "notches" into open fan-spread valleys, sidling along wooded slopes, crossing bare heaths and upland plateaus, threading great forests of hardwood and evergreen.

Until we knew our goal within reach we kept steadily on, but

who with eyes open could do other than slow down here and there to drink in the varied scene? It was the near-by views that tempted most to get out and explore. Our fancy kept peopling the dripping rocks, the dark gorges and shadowy depths of the woods with rare flowering plants and ferns; again and again came beckoning fingers to lure us along mountain trails or winding woodland paths. Just how often in spirit we leaped from the car to clamber up some springy slope among the boulder fern, bog-trot about the "ox-bows" or browse in some low rich meadow, it would be hard to tell; but only on the afternoon of our third day did we actually call a halt.

It was Butterfly Orchids that did it, huge spikes of mauve bloom on almost thumb-thick stems, far finer than we had ever seen in our own home country. And when we waded out through the meadow grass to where they were growing, behold! dozens of Ragged Fringed hidden in the tall herbage, with here and there a white-flowered stem or a rose-tinted spike of Andrews' hybrid. Often as we had heard of this last, we had never met it before, and the Ragged Fringed we had seen but thrice. Even the Small Purple, strangely enough, is infrequent in our part of the world. But we found it abundant all through the mountains of western New England; in meadows and marshes, on wooded slopes and wet banks.

To our disappointment these plants all proved to be *Habenaria psycodes,* the big solid cones of purple being made up of comparatively small flowers. But when our guide to the "Three Birds" learned that we had never seen *Habenaria fimbriata,* he took an afternoon off and led us up the wooded mountain slopes from Squam Lake; and there, about half-way up, where some small streams spreading out over a wooded plateau had converted it into a wet-floored marsh of dead leaves and tangled thicket, we had our first meeting with the famous Large Purple Fringed. A single glance was enough to tell us we were looking at an entirely new orchid. It had something the habit of

Habenaria leucophæa, carrying a loose open raceme on the top of a very tall stem. The individual flowers stood out to great advantage—big pale mauve blossoms with very long slender spurs; they looked twice as big as those of *Habenaria psycodes*. Altogether it was a most satisfying sight; these plants were no more to be confused with the Butterfly Orchid than the Prairie Fringed is with the Ragged.

We of New York State have been more fortunate still. We first found this beautiful orchid in unmistakable form within our own State borders, while on a trip through the Adirondacks. And later in New Brunswick we saw it at its fullest perfection. Its magnificent spires, ranging from true purple to the palest rose, were a constant source of astonishment and delight along the way. We found, by actual measurement, blossoms with a lip-spread of 1⅛ in. The flower spike was sometimes over 3 in. wide and nearly a foot long; an extreme length of 15 in. has even been recorded. None who have seen it in such splendor will ever forget it; a magnificent orchid, quite the largest of all our Habenarias.

XX. PURPLE FRINGELESS ORCHID

(*Habenaria peramœna*)

NAMES: COMMON: Purple Fringeless Orchid, Purple Fret-lip, Pride of the Peak. SPECIFIC: *peramœna* (Gray, 1848), "very lovely."

PLANT: STEM: 1–2½ ft. high, leafy. LEAVES: oblong-ovate to lanceolate, 4–8 in. long. SPIKE: cone-shaped to cylindrical, densely to loosely many-flowered, 2–7 in. long, 1–2½ in. wide.

FLOWERS: Rich phlox-purple. SEPALS: round-ovate; lateral pair ¼–⅓ in. long, upper one smaller. PETALS: smaller than sepals, clawed at base, entire or slightly erose at apex. LIP: 3-parted, ⅜–⅝ in. across; wedge-shaped segments without the long lace-point fringe, but with edges irregularly eroded, middle lobe notched; spur, curved, clavate, about equalling the ovary.

PLACE AND TIME: DISTRIBUTION: Pennsylvania to North Carolina in east; west to Illinois, Missouri, and Alabama. HABITAT: wet places and alluvial

deposit about wood borders, in fields and on banks. SOIL PREFERENCE: moderate acidity. SEASON: June in south, July–August farther north.

SPECIAL FEATURE: Flowers eroded instead of fringed on margins.

THE Purple Fringeless well deserves the name of "very lovely" (*peramœna*); its flowers are large and of a beautiful color almost unique among our orchids, not mauve like the Butterfly Orchid, but rich red-purple. In its range it is much narrower than its nearest allies the Purple Fringed; for though a little more venturesome to the south than *Habenaria fimbriata* and to the west than *Habenaria psycodes*, it reaches its northern limit in Pennsylvania and Illinois.

The plant stands from 1 to 2½ ft. in height; its leaves are ovate to lanceolate; the blossoming spike is usually cylindrical, dense, and many-flowered; but occasionally, even at flourishing stations, loosely few-flowered. The sepals and petals are wide-oval, the latter clawed at the base. The lip is fan-spread into three wedge-shaped lobes, and the big central lobe is further subdivided by a cleft or fold in the middle of the apical margin. The outer edge of all three lobes instead of having a long, lacy fringe is irregularly "eroded" or gnawed out, as though by a caterpillar. The spur is much the same length as the ovary, curved and clavate.

Its home is about the edges of rather open wet woods, or in moist meadows and low marshy pastures. It seems to be rather irregular in its growth, the colonies seldom appearing twice running at the same spot, and some seasons not showing up at all.

Our first venture after *Habenaria peramœna* was made in Ohio. We had just brought our long quest of the Prairie Orchid to a triumphant close, and in the flush of our pride swung south for the Purple Fringeless. It was several hundred miles and half a week off our route, but who cares for space or time with a new orchid beckoning at the end of the trail? Besides, a generous correspondent had just written offering to guide us to one

Plate 31

PURPLE FRINGELESS ORCHID

(*Habenaria peramœna*)

Plate 57

PURPLE FRINGELESS ORCHID

(*Habenaria peramœna*)

of her pet colonies. So for Cincinnati we headed, in one of the fiercest heat-spells ever known to Ohio.

Of course it was too much to expect—Prairie Orchid and Purple Fringeless both on one trip; and we felt from the start that some imp of perversity tagged at our heels. We really did see the plant and a few good blossoms, but in such sort that we wanted desperately to see it all over again and better. The drought held everything in its parching grip; even the low places—heavy-looking sedgy spots such as the Purple Fringeless loves—were bone dry. Our first plant, which ought to have stood between one and two feet high, was hardly five inches above ground and though budded had not a single blossom open. It was growing in stodgy soil that must normally have been a marsh floor very wet if not submerged.

With this poor stunted guide to tell us how and where to focus our looks, we managed to find a few more. The trail eventually brought us within the fringe of a sparse second-growth wood—evidently subject to overflow in an average season. Here we came upon some half dozen plants, favored with shade, no doubt, and possibly dew, that stood about 12 in. high and bore two or three fully open blossoms. They were strangely attractive: strangely, by reason that, familiar as we were with all this group, we now saw one whose lip-fans were shorn of their fringe; and attractive, because added to all the charm of our well-beloved Purple Fringed, they had an entirely new color—phlox-purple, if a single phrase can paint the richness of their hue.

But the "jinx" or whatever it was still clung like a bur. Armed with the very best specimens we could find, we hurried eagerly back to our quarters to make a lasting record of this lovely rare new orchid. Bringing our camera into play, we made several exposures; and the usual immediate development—with plenty of ice to safeguard against the excessive heat—proved them to be all right. But alas! with the negatives safely developed, actually fixed, and under the flowing faucet for their final

washing, suddenly the emulsion began to run, and before a rescue could be made, most of them were ruined. A subsequent test of the water, after an hour's continuous flow, registered 90 degrees Fahrenheit.

The golden "second sight" we longed for came to us quite unexpectedly while searching for Spring Ladies' Tresses near Washington. There could be no more lovely setting for an orchid than Maryland in mid July. Never since our summer at Cape May had we seen such a riot of beautiful flowers. Bright patches of Milkwort were everywhere, citron, orange, rose-pink and purple; we recognized all our old friends and even made some new acquaintances. The Bunch Flowers were in bloom; our very first trail of the day led us past a wet wood that was full of them, big handsome lilies nearly five feet high with immense panicles of creamy white blossoms.

Prime favorite among the new flowers was the lovely Starry Campion. Nor were we its only admirers; the Sulphur Butterflies must have thought themselves in clover the way they crowded to its flowering sprays. It was a pretty sight indeed to watch those black-bordered wings of yellow fluttering at the dainty white blossoms. Two other flowers that we found it hard to take our eyes off were Wild Sweet William—a Phlox with spotted stem, and "Blue Hearts," a most unusual and strikingly beautiful flower, close cousin to the Gerardias.

Maybe that wayside field, with a little stream meandering through the middle of it, was just an ordinary pasture; but as soon as we spied the patch of rose pink in a sedgy trough at one end of it, all the magic of Cape May was on us and we were over the fence in a twinkling. Sure enough, it was our beloved Sabatia once more, the square-stemmed kind with fragrant flowers beautifully marked with a yellow-green star at the centre. Last time we had seen these pale rose-pink blooms they flagged our way to Snowy Orchids and orange spikes of the Crested. And all at once, as if our thought had been a wizard's spell, we saw

standing among the sedges in front of us, a stem of Purple Fringeless; and a moment later several more.

They were only in bud, which accounted for our having overlooked them at the first approach. Later on, to our intense delight, in a green oasis at the heart of an immense thicket of brambles, safe in their cattle-proof zareba, we found a whole colony in perfect bloom. They were beautiful plants, tall and luxuriant, with big spikes of showy blossoms, far handsomer than any we had seen before. Here at last was *Habenaria peramœna,* "the very lovely." It might almost have been a new flower, except for those tell-tale fretted edges and the color. We could not but marvel, as we looked at it, how exactly was reproduced in Maryland the peculiar rich phlox-purple we had noted in Ohio.

XXI. HYBRIDS

H. Chapmanii = *H. cristata* x *ciliaris*—Florida, August.
H. Canbyi = *H. cristata* x *blephariglottis*—N. J., Del.; July-August.
H. Andrewsii = *H. lacera* x *psycodes*—Nfd., N. S., New Eng., July-August.

Hybrids are comparatively infrequent among the orchids, and this is what one would naturally expect from flowers so highly specialized. But wherever close relatives of like form bloom together, there seems no reason why interbreeding should not occur. Among the orchids of Europe many cross-bred forms have been observed, several of them the offspring of parents belonging to different generic groups. In our New World flora the natural hybrids known to occur are all between kindred members of some single group like the Rein-orchids, the Rattlesnake Plantains, or the Ladies' Tresses.

The best known of these half breeds occur among the Fringed Habenarias. The Crested Orchid has been found interbreeding,

in Florida, with the Yellow Fringed (*H. Chapmanii*), and in New Jersey and Delaware, with the White Fringed (*H. Canbyi*), the offspring in each case half way in size between its two parents, and in the latter instance mid-way in color also. These two hybrids are pretty strong evidence against the theory sometimes propounded that such forms as *H. orbiculata* and the almost identical *H. macrophylla* can never interbreed because of their difference in size; for the flower of the Crested Orchid is only half as large and its spur only one-third as long as those of the Fringed Orchid, whether Yellow or White. These latter two themselves interbreed freely wherever they flower together, and doubtless the same is true of the two Purple Fringed—the Large and the Small.

Probably the most famous of all our hybrids, both for beauty and for rarity, is the cross between the Ragged and the Butterfly known as Andrews' Rose Purple Orchid. Ever since we first read of this treasure in "Bog Trotting for Orchids" we have been on the look-out to see it, and have even made several long trips with "*Andrewsii*" as a special objective. When success came at last, it came, as so often happens, unbidden; the discovery was accidental and all our own. While crossing Vermont for a sight of the "Three Birds" in New Hampshire, we were suddenly semaphored on the roadside by some luxuriant flowering stems of the Butterfly Orchid; on wading out into the middle of a meadow of mowing grass, we found scores of Ragged Orchids sharing the cover with Purple Fringed, and among them some flowering stems of genuine *Andrewsii*, a blend of both parents, its rags and tatters as deeply divided as those of *H. Lacera* and even more numerous, its color white, rose-tinged.

III

TRIBE OF THE BIRD'S NEST ORCHID

		GENUS
IV.	Twayblade	*Listera*
V.	Crest-lip	*Pogonia*
VI.	Funnel-Crest	*Cleistes*
VII.	Whorl-Crest	*Isotria*
VIII.	Nodding-Crest	*Triphora*
IX.	Arethusa	*Arethusa*
X.	Grass Pink	*Calopogon*
XI.	Helleborine	*Amesia*
XII.	Ladies' Tresses	*Spiranthes*
XIII.	Rattlesnake Plantain	*Epipactis*
XIV.	Ponthieu's Orchid	*Ponthieva*

IV

TWAYBLADE (*LISTERA*)

I. HEART-LEAVED TWAYBLADE

(*Listera cordata*)

NAMES: COMMON: Heart-leaved Twayblade, Heart-leaves, Mannikin Twayblade. GENERIC: *Listera* (R. Brown, 1813), "Lister's;" SPECIFIC: *cordata* (Linnæus), "heart-shaped," of the leaves.

PLANT: STEM: 4–8 in. high, occasionally more; pale and smooth below the leaves; pubescent, slender, scape-like above. LEAVES: a pair, at middle of stem, round-ovate, somewhat heart-shaped, ½–¾ in. long. SPIKE: loose, few-flowered, sometimes crowded.

FLOWERS: Watery purplish to yellowish green with wide-spread perianth parts; minute. SEPALS: pale green tinged toward apex with watery purplish-brown, lance-ovate, 1/10–1/11 in. long. PETALS: watery purplish green throughout, narrower. LIP: ranging from watery purplish green to reddish brown, lance-linear, deflected, 1/5–1/6 in. long; split to half way or more into a pair of lanceolate divergent prongs, and armed forward of the base with a pair of curved horns, usually erected in full inflorescence.

PLACE AND TIME: DISTRIBUTION: transcontinental; Labrador to New Jersey in east, west to Pacific Coast from Alaska to New Mexico; also Greenland, Iceland, Europe, and Japan. HABITAT: mossy bogs, chiefly in sphagnum; and damp wood floors under evergreens. SOIL PREFERENCE: apparently indifferent, quite at home in limy ooze or acid humus. SEASON: May to June, and lasting through July.

SPECIAL FEATURE: Lip, small, narrow, two-pronged, toothed at base.

THE Heart-leaved is the most familiar of all the Twayblades, well-known in Europe as well as with us. Though you will meet with it as far south as New Jersey and California, its true home is in the north and it appears to thrive even in sub-arctic regions. It can hardly be called a common orchid, but we have found it abundant in not a few districts. From the rich tamarac swamps of New York to the cold spruce bogs of Northern On-

tario, wherever loose beds of moist sphagnum occur, the orchid-hunter stands sporting chances of finding this inconspicuous little Twayblade.

Like all the Listeras it carries a pair of sessile leaves about half-way up the stem. These are the "twayblades"; and so oddly situated as they are, spread out like a pair of panniers, they form an excellent "earmark" by which to know the group. Only two of them have a narrow lip deeply split into linear prongs, and a glance through the lens will tell you which is which: the lip of the Heart-leaved is toothed at the base, while that of the Southern has instead an apicle in the fork.

The flower of the Heart-leaved is peculiar among orchids in having its sepals and petals all wide-spread; they stand almost at right angles to the top of the ovary, while the lip is deflected and then juts forward below. Near the base it is armed with a curious little pair of teeth, that project at the sides in the young flower and later stand up like horns with outcurving tips; they are apparently connected below by a tiny frontal ridge quite visible under the lens. In spite of being so small and inconspicuous, the flowers are very freely pollinated, often by tiny ants, and develop their plump little ribbed ovaries quite early in the season. The perianth persists with scarcely any shrivelling till the close of summer.

This delicate little plant is often found in damp cedar thickets, but an even more favorite haunt is soft beds of sphagnum in rich swamp cover. It seems to avoid the more compact cushions, but spreads freely where the moss is loose enough for the seeds to sink in and germinate. The stem is often buried up to the pair of leaves, and what stands above the moss is no more conspicuous than the scores of tiny twigs and stems of underbrush that surround it, a shadow among shadows.

We have found by experience that two of us may be standing side by side looking straight at a colony of these Twayblades, and yet the plant so plain to the one will be quite invisible to

Plate 58

HEART-LEAVED TWAYBLADE

(*Listera cordata*)

the other. So much depends on the angle; a lucky glint of sun will make the spikes stand out quite strongly; step hastily toward them, and they vanish into shadow as surely as if they had eaten fern-seed. The best way to run to earth these wraiths of the sphagnum is to stoop or kneel till the eye is close to the level of the ground and sight along the surface of the moss in all directions; a "worm's-eye" view like this serves to silhouette the plants against the background. Next best plan is to "mouse" about slowly, stopping at every step long enough to let the eye take in the minuter details. Almost every plant, according to size, shape, color, and surroundings, requires a special focus; "one thing at a time," is therefore an excellent motto if you want good hunting on the orchid trail.

Just how rare this plant really is we can never quite agree; but beyond question it escapes notice *far more often than not*. Our own first find was made away north in the lonely wastes of spruce, and for years we looked on this as a unique stroke of luck. Then suddenly we stumbled on a colony near enough home to study the habitat closely, and since then nearly every rich bog in the neighborhood proves to contain it.

When we came to compare notes from both sides of the border, we found this Twayblade was closely linked up in all our minds with some rare or interesting occasion. Our partners had found it abundant under the old arbor-vitæs where they saw and pictured Calypso; our first find was made in cutting across a "beaver swamp" to visit a wonderful colony of Matricary Grape Ferns—huge plants, bigger by half than any we had ever seen before. We have found it since with some of our rarest Lady Slippers, with Bog Malaxis, with White Adder's Mouth, and with its own first cousin the Broad-leaved Twayblade. And all four of us will long remember the day when in one and the same rich bit of cover we happened on the Little Round-leaf Orchis, Striped Coral Root, and Heart-leaved Twayblade growing together.

Our favorite station lies within six miles of home, and we have paid it so many visits at flowering time that already the whole trail is rich with memories. We know without fail each June that the Maryland Yellow-throats will greet us as we pass along; we can hear their "witchity, witchity" call from the alders as we write; and we shall certainly be much disappointed if those Canada warblers with their handsome collar of jet don't come out from the fringe of tamaracs to flutter and scold beside our path. And how can we ever forget the puzzling little pair that built in the underbrush, or the photographer's proof of the old adage about a bird in the hand when he caught the male on the nest and found they were Nashville warblers?

One of our biggest small thrills of the wildwoods came to us here as we passed through the poplar belt on our way to visit these Twayblades. We had just flushed a black-billed cuckoo from her nest and were smiling down at the irony of a cowbird's egg in her clutch, when we heard a familiar hum overhead and glanced up to see the aspen leaves blowing this way and that. Moving cautiously out to a more open spot we presently spied a Rubythroat gathering down for its nest. We had never seen the bird so employed before and watched it closely for a long time. It first hovered in front of the tree, apparently looking to see where the poplar-cotton was thickest; then it darted forward with slightly opened mandibles till they were buried in a tuft; then it evidently closed its beak, for when it backed away, there was a wisp of cotton at the base of the bill; again and again it repeated this act, and finally darted off above the trees, adorned with a big pair of white mustachios. From first to last the wings were vibrated with lightning speed, and it remains a mystery how this living aeroplane shifted its gear from forward to reverse.

These are all border-tales, but you may well suppose what an atmosphere they give to this haunt of the Heart-leaved Twayblade. Within a few yards of the spot, besides a dozen commoner

kinds of orchid, we have found flowering with it, at various times,—Ram's Head, Little Round-leaf, Arethusa, and Green Adder's Mouth.

II. SOUTHERN TWAYBLADE

(*Listera australis*)

NAMES: COMMON: Southern Twayblade, Shining Twayblade, Apicled Cleft-lip. SPECIFIC: *australis* (Lindley, 1840), "southern."

PLANT: STEM: 5–8 or 9 in. high, fairly stout, crimson-purple and smooth below leaves, greenish purple and puberulent above. LEAVES: 2, rich green, oily-smooth, thickish, wide ovate, about 1 in. long. SPIKE: loose to dense, longer than scape-like peduncle above leaves

FLOWERS: Small, reddish purple, bracted, on slender pedicels (⅓ in. long). SEPALS: purplish green, ovate, 1/10–1/11 in. long, wide-spread. PETALS: greenish, lanceolate, strongly reflexed and curled over lengthwise. LIP: dull red to rich ruby with green stripe down the median line: lance-linear, about ⅓ in. long, recurrent at base, split from apex to below middle into a pair of linear prongs with an apicle in the fork.

PLACE AND TIME: DISTRIBUTION: Florida and Louisiana to Northern Vermont, New York, and Ontario (Ottawa). HABITAT: rich bogs, chiefly in sphagnum and brush cover. SOIL PREFERENCE: strong to moderate acidity. SEASON: February in far south, June–July in north.

SPECIAL FEATURE: Lip narrow, deeply linear-pronged, apicled in fork.

THE Southern is our favorite of all the Twayblades. It is so neat and trim in appearance with its sturdy stem and up-curving polished leaves supporting their spike of purplish long-pronged flowers. Small as they are, the lips have a richness of coloring that would be hard to beat. When the sun shines on them no garnet or ruby could surpass their crimson glow. It is quite a rarity in our part of the world and the two or three stations we know of in New York State are very highly prized. Its true home is farther south; but it has been found in northern Vermont, and some years ago the late Professor Fletcher discovered it growing in the Mer Bleue, an extensive bog near Ottawa.

Plate 59

SOUTHERN TWAYBLADE

(*Listera australis*)

The plant is about the same height as the Heart-leaved, but of sturdier form. The stem is purple and the pair of leaves rather dark green, smooth, shining, and fairly thick; they are comparatively small in proportion to the size of the plant, scoop-like, and ascendant. The spike is decidedly long, sometimes twice the length of the scape; in the Heart-leaved these proportions are reversed.

The flowers themselves are very similar to those of the Heart-leaved, but the petals are strongly reflexed and the lip is far more richly colored—a deep mahogany or ruby-red instead of watery purple; moreover, it is much longer in proportion, more deeply split and with less wide-spread prongs; instead of being toothed at the base, it has a tiny lobe in the fork of the prongs. The reflexing of the petals is of special interest, for it serves as a link with the wide-lipped group, in all of which the perianth parts, sepals and petals alike, are strongly recurved.

Like the Heart-leaved it makes its home in rich sphagnum bogs and produces its flowers very early in the season. In some of its haunts it might almost be said to have two flowering seasons; for the plants that grow in the open blossom at the end of May and are actually past their prime by the middle of June, while those under cover seldom produce their flowering-spikes before July.

It is decidedly rarer and more local than the Heart-leaved and just as difficult to see, even when not growing in shrubby cover. Both plants love to luxuriate in soft sphagnum beds, where so much that is strange and curious in our bog flora abounds. Such things always add to one's pleasure in the quest of these Twayblades; and, then, their home is so secluded, their form so elusive and seldom seen, the perfection of their orchid mechanism on this minute scale so miraculous that one feels drawn to them with a strange attraction. With all who know the Listeras, these two are the prime favorites.

To us the Southern Twayblade brings back vivid memories of

an out-of-the-way corner in New York State, a land of drumlins and chestnut groves set in a season of soft balmy airs, where winding roads go up hill and down dale among rich woods and flowery meadows, the home of Ragged and Purple Fringed Orchids, nodding Turk's Cap Lilies and golden-brown racemes of Wild Senna. And in the heart of it—as who can forget?—lies a luxuriant mossy bog filled with sphagnum and thickets of Virginia Chain Fern, Heaths, Azaleas, and—at every step—orchids upon orchids.

The bog is really no more than a small corner in a great area of low land, a tropical oasis in a desert of dismal swamp. In point of fact, this is the way with most orchid covers; they keep their treasures in scattered nooks and pockets; that is a wrinkle worth remembering, and we say so with all the more emphasis because two of us chose to ignore it the first time we visited the bog and got well served out for our pains.

We thought if we crossed a dense belt of swamp-ash we might discover some unknown Eldorado at the other side. For more than an hour we groped and struggled and plunged over stumps and logs in the midst of the ash-woods, among acres of high-crowned Cinnamon Fern, Skunk Cabbage and Poison Elder, and so deep down that we couldn't see out over the surface of the swamp to get our bearings by ridge or knoll on its margin.

Both of us had compasses, but unfortunately both of us had also ideas about the lie of the land and the direction of the road. After a heated altercation we agreed to take a middle course, and if there's one thing in the world foredoomed to failure it's a compromise on the points of the compass. Fortunately, few of the roads in this district steer by the stars or run at right angles. The net result was that we both emerged separately from the swamp at opposite ends of a big "bay" filled with cat-tails, and adjourned independently, each chuckling to think the other had been wrong, to an adjacent roadway. Here we met, going opposite ways, but both convinced we were heading right. A farmer in a near-by field

was hastily called on to arbitrate; and we learned that instead of crossing the swamp as we had set out to do, we had swung back to the side we started from; the road we were on was a by-way running "catty-corners" to the direction required. Moral—when you find a rich corner of bog-moss and orchids, stay right with it, and never meet a man half-way on the points of the compass.

Fortunately, the spot from which we had started out on our wild-goose chase was not far away, and it didn't take us long to bury our differences in sphagnum and flowers; for "Featherbed Bog," as the brotherhood have happily named it, is one of the most enchanting spots that could possibly be imagined. From the end of May when its floor is decked with Arethusas, Pink Moccasins, and Yellow Lady Slippers, to late July when its mossy lanes and luxuriant bowers of sedge and fern are gay with Rose Pogonia, Grass Pink, and White Fringed Orchid, this is an ideal corner of the world to "fleet the time carelessly" in.

And to the orchid enthusiast at least, if not to every nature-lover, its fascination is in no small measure due to the presence of the Southern Twayblade. Garbed in gray-brown and green, it is nowhere obvious, but once you learn its secret you will unmask it in quite a few of the nooks and corners; sometimes standing unnoticed right in the open, more often nestling shyly, as it loves to do, under the shrubby fringe of the borders. We have found it flowering at the end of May side by side with that other rarity of Featherbed Bog, the Whorled Pogonia, again in July, with the Rose Pogonia, and later still when the Nodding Pogonia and Hooded Tresses appeared.

III. AURICLED TWAYBLADE

(*Listera auriculata*)

NAMES: Common: Auricled Cleft-lip, Little Ears. Specific: *auriculata* (Wiegand, 1899), "with little ears" or auricles.

PLANT: Stem: pale green, 3–7 or 8 in. high, densely puberulent above leaves. Leaves: wide oval to elliptic, rather thin, smooth, pale, 1–2 in. long. Spike: Loose, usually many-flowered, about twice length of peduncle; bracts, pedicels, and ovaries smooth.

FLOWERS: Pale whitish green, 1/3–2/5 in. long, lip broad, perianth parts all strongly recurved. Sepals: pale greenish white, lanceolate, 1/3 in. long, strongly reflexed. Petals: similar, but narrower. Lip: watery whitish green, 1/2 in. long, round-oblong, as wide at base as at apex, narrower at middle; dilated slightly at base and carried backward into a pair of small parallel ears incurved and acute-angled at corner adjacent to point of attachment; divided at apex to about quarter-way into nearly parallel lobes, apicled in fork.

PLACE AND TIME: Distribution: Newfoundland, Quebec and Ontario; also Maine, New Hampshire, New York and Michigan. Habitat: about wet thickets, especially alder, on swamp borders and river banks. Soil Preference: acid, or indifferent. Season: June–early August.

SPECIAL FEATURE: Lip with a pair of small parallel incurve-pointed auricles at base; "twayblades" usually broad.

The Auricled Twayblade is so named from the pair of rounded ears at the base of the lip. It is a more conspicuous plant than the Heart-leaved or the Southern, its leaves nearly twice and its blossoms many times the size of theirs. It is very local, but fairly abundant within its range and comparatively easy to detect for any one familiar with its peculiar habitat. It occurs in the region of Lake Superior but is much more widely spread about the Gulf of St. Lawrence.

The plant averages some 4 inches in height and has a pair of roundish-oval leaves above the middle of the stem. It is pubescent on the rhachis but smooth on the pedicels and ovaries. The flowers form a loose raceme; the sepals and petals are strongly reflexed, like the corolla of a cranberry blossom; the dilated lip is nearly one-third of an inch in length, oblong in shape and owing to its pair of rounded shoulders or auricles actually widest at the

base; its apex is deeply cleft with an oblong notch. The color of the flowers is neutral, a translucent washy purplish-green, hardly to be picked out at a distance from the general gray-brown-green undertones of its environment. Seen from above, the plant has the appearance of a pale watery-green rosette of flowers supported by a pair of spreading roundish leaves; but in profile the 6–10 or 12 blossoms are seen to stand out well separated in a two-inch-long spike.

Its usual home in the Laurentian region appears to be river flats under almost any cover so long as there is cover; it seldom grows much above water level and has an evident fondness for places subject to inundation and frequently enriched with fresh alluvial deposit. It has occasionally been reported from cedar swamps and mossy banks; and we have ourselves found it in just such cover near Thunder Cape.

It was while en route between Buffalo and New Brunswick that we first met this rare little orchid. And it has struck even us, confirmed orchido-maniacs though we are, as not a little strange that four inches of verdure (the average height of the plant) should have served to give shape to our course through three thousand five hundred miles of territory. For we so planned and plotted our journey as to keep in touch with the Auricled Twayblade throughout a great part of its range. Our route took us up into Northern Vermont, along the south shore of the St. Lawrence, through eastern Quebec and across the Gaspe Peninsula; like the trip to New Jersey it yielded us an immense amount of pleasure and so many surprises as to be something in the nature of an eye-opener.

From a mere tourist's point of view the trip was unusually interesting. Day after day we rode along the seacoast in the midst of astonishingly bold scenery. The quaint customs of New France, our frequent contacts with the all-engaging industries of lumbering and fishing, a thousand little adventures and misadventures, brought us daily entertainment. And added to it all for us was the

Plate 60

AURICLED TWAYBLADE

(*Listera auriculata*)

pleasure of meeting with a whole new flora under very novel conditions.

What particularly struck us was the number of orchids found growing in open dry places that in our own home territory we associate with wet swamp cover. *Habenaria hyperborea* was common all along the exposed shores of the Gaspe Peninsula; *Listera cordata* flourished on the steep arid northeast slope of Mont Ste. Anne, once actually high and dry on a knoll in a bed of spruce needles; *Malaxis monophyllos* we saw growing to perfection on Bonaventure Island in an open field, under the full glare of the sun.

Conditions were much as in Great Britain, where many species of *Habenaria* and *Orchis* flourish on open moorland. Indeed the bold bluffs and rather bare heaths, as some of the residents told us with pride, are strongly reminiscent of Scotland. The very plants appear to recognize this and we more than once met with old-country forms in our wanderings. Few things in the whole trip gave us greater pleasure than one such encounter; for it was here that we first saw that typical plant of moor and mountain, the Moonwort.

Of all the Grape-Ferns this is surely the most curious and fascinating; its very name spells magic and a thousand years of legend. But it is extremely rare and local with us, and its discovery in the Gaspe rounded up the whole group. It appears to be a characteristic feature of the region; we actually ran into colonies of it on five different days; each time larger plants than before, so that we had a whole series in ascending scale from dwarfs hardly distinguishable from the Little Grape-Fern to big fleshy giants nearly ten inches tall.

In our rounding up of *Listera auriculata* we had planned our campaign very carefully the winter before by voluminous correspondence and the searching and sifting of previous records. These proved all too few at the best, and we set out with a very hazy idea of the plant, and desperately afraid that we might pass

it over for *Listera convallarioides* if we should happen upon it. Very fortunately we tried some 'prentice work in the field before reaching the districts where it most abounds; and in Northern Maine we succeeded in running our quarry to earth.

The first colony, a few meagre plants in a thoroughly uncongenial station, was only discovered after nearly two whole days' gruelling search; and when we returned with the camera next day we found the colony cut off by a bush fire. Our next venture was at the foot of a steep wooded river bank; here we found progress so difficult that we had at times to wade in the swift current holding on to the fringe of trees and shrubs. While crossing an almost impassable mat of brush and slashing high up on this bank one of us performed a really remarkable gymnastic feat. It is for this member of the party that all natural obstacles seem to make a dead set—dogs, bulls, barb-wire, fence-rails, rotten logs, loose stones, even snakes; they never fail. It was a public performance, too, for the initial movement was accompanied by a slight cry, and all eyes were turned in time to see the acrobat dive head-first into a pile of brushwood, disappear down to a pair of gesticulating rubber boots, and then suddenly emerging turn a complete somersault on the face of the slope.

These two trial trips in Maine completely solved our problem, for they taught us not only what to look for but precisely where to find it. And we used our well-earned wrinkles with perfect success in the adjoining Province of Quebec, first in the neighborhood of St. Anne des Monts and then at Percé, that delightful centre of so many outdoor interests.

It was an agreeable surprise to learn how easily distinguished this new Twayblade was from *Listera convallarioides*, the lip with its backward-pointing ears being widest at the base and having its rounded-oblong tip so deeply cleft. And just as Prof. Fernald has told us, within its range and in its peculiar habitat it is fairly abundant and not at all hard to see. Again and again when we spotted a likely bit of cover, our search was rewarded by one or

more colonies of the plant; always near the bank of the river, and not far above water-level; now in a fairly dry alder thicket on a low level bench covered with a recent deposit of silt; again in a stretch of fairly thick mixed woods, either right on the bank or a little way back in open spots and shallow depressions, all evidently subject to inundation by spring freshets.

Since our Gaspé trip we have had the surprising adventure of meeting the Auricled Twayblade at Thunder Cape where it grew under alders on the borders of a large spruce bog. None the less we should dearly love to have our trip to Percé all over again. We have a strong feeling that this Twayblade will be found along most of the principal rivers of Northern Maine and New Brunswick, as well as the Gaspé Peninsula; and if our luck holds, we hope to try out our theory in the field some day.

IV. NORTHERN TWAYBLADE

(*Listera borealis*)

NAMES: COMMON: Big Ears, Narrow-leaves, Northern Twayblade. SPECIFIC: *borealis* (Morong, 1893), "northern."

PLANT: STEM: mostly 2–6 in. high; below leaves, 4-sided, greenish white, smooth; peduncle and rhachis puberulent. LEAVES: narrowest in the genus, lance-ovate, rarely wider; smooth, pale; ½–1½ in. long and about half as wide.

FLOWERS: Pale green, 2 or 3 12 in a loose spike, set on pedicel-ovaries ⅓–⅕ in. long, perianth parts all strongly reflexed. SEPALS: pale green with darker mid-vein, ⅕–¼ in. long, falcate lance-oblong. PETALS: narrower, lance-linear to awl-shaped. LIP: pale translucent green with a lozenge to oblong boss of darker green at centre, bisected by the median line depressed and white; lower end of median line blocked by a tiny ledge overlain at the sides by a pair of fleshy groins that converge toward the base of the column; about ⅓ x ⅛ in. rounded oblong, narrowest at middle; base greatly dilated at sides and extending far backward and outward into a pair of large divergent auricles, rounded or blunt-angled at corner remote from point of attachment; apical lobes oblong, round-pointed about 1/12 in. long, small tooth in fork.

PLACE AND TIME: DISTRIBUTION: Mingan Islands, Gulf of St. Lawrence, to Hudson Bay, Alberta, the Yukon; also, Colorado and Idaho. HABITAT: usually under dwarf spruce, in dry humus, needles or moss; occasionally in the open and on borders of marshy willow and dogwood thickets. SOIL PREFER-

ENCE: probably indifferent, in acid humus and on limestone floors at Mingan Islands. SEASON: end of June to late July.

SPECIAL FEATURE: Basal auricles of lip large, divergent, round or blunt-angled; median line white framed in dark green; "twayblades" usually narrow.

THE Northern Twayblade is almost a facsimile of the Auricled; and its recent discovery by Brother Marie-Victorin, so close to where we had staged our famous drive of the Auricled made us eager to compare the two. So the first week of July 1928 found us ensconced at the little fishing village of Havre St. Pierre, talking French and exploring the Mingan Islands.

Our language adventures made much of the fun of a most enjoyable trip. We took our meals "au dictionnaire," and French conversations too original to print enlivened the rest of the day. Some palpable hits gave us courage at the start, but not all our shots told. "Ten dollars"—in English—only poorly repaid Monsieur his best Parisian French for "How long has that rusty old anchor lain at the bottom of the sea?" And Madame's attempt to explain her husband's hobby was never more than well begun; "Mon homme est fou" has long since passed into a family proverb.

The islands were full of the most delightful surprises; sea beaches, limestone cliffs, peaty upland tundras, and forests of dwarf spruce, all crowded with rare and beautiful things. Within half an hour of landing on Eskimo Island, to judge by the flowers, we had passed from the Atlantic coast to the shores of Lake Huron and Thunder Bay, and were presently revelling first in the heart of the Rockies and then up among the Bens of Cromarty. Sea Purslane and Oyster Plant rubbed shoulders with Bird's-Eye Primrose and Butterwort, White Camas and Sticky Tofieldia with Alpine Bistort and Scottish Asphodel. Moonwort grew everywhere, and about the rocky headlands we found Roseroot, the dainty little Tufted Saxifrage, fairy mats of "Opposite-leaved" crowned with rose-purple blooms, Small-flowered Grass of Par-

Plate 61

NORTHERN TWAYBLADE

(*Listera borealis*)

Plate 62

NORTHERN TWAYBLADE

(*Listera borealis*)

nassus and the beautiful White Mountain Avens (*Dryas integrifolia*).

The dwarf spruce that hid the Northern Twayblade proved one of the most fascinating covers we have ever stepped into. Along its edges ran a lovely border of Bearberry, Twinflowers, and Creeping Cranberry, all in a profusion of richly colored bloom. Here and there among them, like some giant Club Moss, went strands of Trailing Juniper, and once in a while we came upon a heathery cushion of Alpine Azalea (*Loiseleuria*). The Arctic Raspberry was very abundant, and in the sharper soil of the tundras we even found its pretty white-flowered cousin the Cloudberry. Here, too, we were treated to one of our biggest thrills—the famous Rhodora, now seen for the very first time, just in the pink of its perfect bloom.

And add, if you please, a group of orchids that all in all would be hard to match in any single spot. As we sat on the grassy bank beside our first find of Northern Twayblade, we were in the midst of Yellow Lady Slippers the like of which we had never seen before—short-stemmed, big-lipped, and with wide flat petals,—more like the European flower than our familiar golden Moccasin with its long-spiralled curls. In front of us rose the drumhead cliffs of a neighbor island where that very morning we had come upon some humus pockets filled with Franklin's Lady Slippers. A few yards away on our right, in full view among Butterworts and Primulas, stood flowering stems of the Small Roundleaf Orchis, and in the thicket behind us the Enchantress Calypso still held sway.

One thing this first station refused to yield was a perfect plant of the new orchid; and at the end of our second day, when we had drawn every stitch of cover on Walrus Island, we were forced to give it up as a bad job. The larger plants were all of them blackened and torn—wind-whipped in their thickety quarters—or, in flat defiance of previous records, already past their prime. Our best plan, we agreed, as we tramped down the beach to the boat,

was to try some larger island, where these fascinating borders of spruce ran not in rods but for miles at a stretch.

And then a curious thing happened. When the skipper came to haul up his anchor, he found another anchor fouled on its flukes. The jabber of excitement that followed was too much for our poor pennyworth of French, but one thing at least was abundantly clear: an anchor "rattrapée" at sea was as sure to bring luck as a horseshoe on land. And so it proved: our trip next day to Eskimo Island was a veritable triumph that more than doubled the floral wonders of the day before, and revealed the Northern Twayblade at its very best.

Our observations all went to show that in form and structure it came as near overlapping with the Auricled as in habitat and geographical limits. Both in the Gaspé and at Thunder Cape we had been particularly struck with the number of variant features displayed by *Listera auriculata*; the size of the plant, the shape of the leaves, and, above all, the lip—the character of its basal "ears," the apicle in the fork of the terminal lobes, and the depth of the intervening bay, were none of them constant. And so with the Northern; we could find no quite reliable point of distinction to mark it off from the Auricled; and, despite what the books maintain, there was a conspicuous apicle present in many of the flower-lips.

However, though we met once at least with a notable exception, the leaves were nearly always much narrower than those of the Auricled, indeed the narrowest by far of all the "Twayblades." Moreover, the face of the lip was strongly embossed with an oblong or lozenge-shaped shield of dark green, through the centre of which ran the median line as a narrow groove of white. And, by way of ironic comment on our system of nomenclature, it wore a far bolder pair of ears at the base of the lip than *Listera auriculata*. A characteristic feature of these auricles was their being angled, coming to a conspicuous point, or occasionally even two, at the outer corner.

So scarce a plant was naturally one of the last things of all to be found. Our first few glances into the thickets of spruce revealed amazing quantities of Heart-leaved Twayblade, with flowers almost as richly colored as those of the Southern—a really beautiful sight wherever the sun's rays lit up their spikes. Almost as abundant was the Blunt-leaf Rein-orchid; and after that, Tall Leafy Greens and Early Coral Root. The discovery later of Lesser Rattlesnake Plantain and some springy tracts that held White Adder's Mouth and Fragrant Whites completed the tale of our orchids.

Actually, the first little group of Northern Twayblade that we saw stood right in the open; but its true home was in the dense scrub spruce that formed so marked a feature of the region, and nearly always on its shoreward edge. It appeared to thrive best on a clean floor of mossy turf or, occasionally, dry needles. But quite a number of plants, some of them unusually large, were found concealed in the tangle of the drooping outer branches of spruce and even in the border fringe of straggling willow and Shepherdia.

The glory of all the stations was a half-mile stretch of spruce at the south of the island. Our approach to it lay across a big headland where Butterworts and tiny snow-white Primulas (*P. egaliksensis*) alternated with masses of silky-plumed Dryas. Beyond it in a springy tract stood hosts of Fragrant Whites and Small Round-leaf Orchis by the thousand. In the intervening fringe of spruce, beginning where *Orchis rotundifolia* was thickest and stretching away to the east, we found colony after colony of Northern Twayblade, fine plants in perfect bloom, companioned with Calypso and One-flowered Pyrola. It was always at its best in a clean fairly dry floor of moss-covered humus, growing in small groups of three or four, occasionally eight or ten plants.

We paid a last visit to this beautiful spot the day before we sailed for home; and after making a farewell round of our Twayblades, we looked out over the sea toward our beloved Gaspé. Be-

tween us and that home of the Auricled lay nothing but the hazy gray plains of the Gulf and a long low fogbank or something far out in the offing; and even as we looked, the mysterious shape rose up sharp and steep in mirage as the escarpments and cliffs of Anticosti; Anticosti, within whose embrace has also been found this curious twin of the Auricled—the Northern Twayblade.

V. BROAD-LEAVED TWAYBLADE

(*Listera convallarioides*)

NAMES: COMMON: Wedge-lip, Scutcheon Twayblade, Broad-lipped Twayblade. SPECIFIC: *convallarioides* (Swartz, 1800, Nuttall, 1818), "like the Lily of the Valley," referring to the leaves.

PLANT: STEM: stout and robust, 6–10 in. long; peduncle and rhachis glandular-pubescent. LEAVES: 1½–2 in. long, round-oval, smooth, often alternate. SPIKE: 1½–3 in. long, loosely many-flowered.

FLOWERS: Yellowish green with strongly reflexed perianth parts and cuneate lip, ⅓–½ in. long. SEPALS: lance-linear, about ⅓ in. long. PETALS: similar, but paler. LIP: translucent watery greenish veined with yellow, glassy-ridged on median line; wedge-shaped, about ⅖ in. long; spatulate-clawed below, abruptly widened to cuneate by a pair of triangular teeth, and further dilated at apex into a pair of roundish lobes separated by a wide shallow notch with a median tooth.

PLACE AND TIME: DISTRIBUTION: Newfoundland west to Alaska, British Columbia, and California; New England, New York, and Michigan. HABITAT: rich moist leaf-mould; damp woods and wet thickets under deciduous trees, at base of slopes and banks on borders of cedar swamps. SOIL PREFERENCE: indifferent, equally at home in acid and in neutral situations. SEASON: late June–August.

SPECIAL FEATURE: Lip wedge-shaped, spatulate-clawed and angled below, wide shallow-notched at apex.

THIS Twayblade, not very happily named from a fancied resemblance of its two leaves to those of the Lily-of-the-Valley (*Convallaria*), is also a native of the north temperate zone. It has a far greater range than the other two wide-lipped kinds, being found all across the continent from Newfoundland and northern

New England to Alaska and California. Notwithstanding the inconspicuous watery-green of its flowers, it is the most easily detected of all the Listeras, both from its size and from its almost invariable habit of growing in dense colonies. Like the other Twayblades it flowers from June to August.

The plant ranges from 4 to 10 inches in height and has a rather stout stem, large roundish leaves and a loose spike of big-lipped pale watery-green flowers. The stem is smooth below the leaves, but quite conspicuously glandular-pubescent above, on scape, rhachis, pedicels and ovaries. The sepals and petals are pale whitish green and of uniform length; as in the Auricled and the Kidney-leaved, they are all five strongly reflexed, while the big lip is thrust forward below the column in the opposite direction. It is nearly half an inch long and shaped like a wedge. The dilated apex is divided by a wide shallow notch into two rounded lobes. In color the lip is a translucent watery pale green—sometimes slightly tinged with purple; the wings of the lip are veined, but the median line is smooth and clear, slightly raised into a shining glassy ridge, which projects a little beyond the margin so as to form a tiny third lobe in the fork of the other two. The books describe the lip as having a pair of triangular teeth at the base, but these teeth in no way resemble those found on the lip of the Heart-leaved nor the somewhat similar blunt-oblong, flatly outthrust, basal lobes of the Kidney-leaved. It is rather that the lip is suddenly widened from a spatulate claw-like base into a tiny pair of square shoulders; forward of these it is very slightly contracted at the sides before broadening out wedge-wise into the rounded bi-lobed apex.

In general, the Broad-leaved Twayblade is the least attractive of all the Listeras. The large leaves are set high up on the stem and the big lips give the flower-spike an ungraceful rather outlandish appearance. Furthermore, there is seldom much charm about its surroundings. It should be looked for in the low parts of moist rich woods about depressions and along runnels; often in the

Plate 63

BROAD-LEAVED TWAYBLADE

(*Listera convallarioides*)

border line of damp mixed woods surrounding cedar swamps; stations liable to be very wet in early Spring, but in July filled with a low succulent growth; such cover as Oak Ferns love to dwell in, not wet enough for the White Adder's Mouth, and too "thickety" for the Little Grape Ferns.

Like these and other reputed rarities, it is probably more plentiful within its range than is generally supposed by those not familiar with it. Solid beds of hundreds have lately been found in Essex Co., N. Y.; and not very long ago, while exploring a rich little sphagnum bog in New Brunswick, we discovered a colony of them in the heart of a cedar thicket; they were growing in a comparatively open sunlit glade and in their immediate neighborhood we noted three kinds of Rein-orchid—*Habenaria hyperborea, dilatata, obtusata*—as well as another of the Listeras—*L. cordata*. The plants were particularly large and vigorous, and in the prime of their bloom; some of them had been trampled down the very night before by a moose as he browsed on the Fragrant White Orchids and other tit-bits in the moss.

Our first pictures of this orchid were taken at Hatley, P. Q., just over the northern boundary of Vermont; and it was only in 1925 that we found a station much nearer home; no farther away, indeed, than a single day's drive by motor. Two of us had gone on a scouting expedition to the base of the Bruce Peninsula and it was while waiting for a boat to take us across from the Huron shore to a group of neighboring islands that we discovered the Twayblade.

Red Bay, by the map, lies opposite the Fishing Islands between Oliphant and Golden Valley, but for us it is simply a floral paradise midway between the Broad-leaved Twayblade and the Alaska Orchid. Our whole approach had been dotted with surprises in the shape of beautiful and, to us, strange flowers along the wayside. Again and again we had to stop the car and revel among masses of Philadelphia Lilies, Painted Cup, and Spiked Lobelia, lime-stone terraces overrun with Stone-crop, fields bordered with

Musk Mallow, both pink and white, and fragrant for miles with blossoming sweetbriar.

But it was when we made our way down to the beach that we got our biggest surprise. Who would ever have thought Nature could perform such miracles by merely mixing wet sand with limestone? To Orange Lilies and Castilleia were added the rich tones of Golden Ragwort and Gmelin's Puccoon; Harebells and Blue-eyed Grass mingled with Lobelias. And then the bog plants; Mauve Primulas, both Bird's-eye and Dwarf side by side; Yellow Bladderworts, Horned, Hooded and Flat-leaved; Sundews, Round-leaved, Spatulate and Slender; and Grass-of-Parnassus, the common marsh kind being here almost entirely replaced by the Small-flowered and the Carolina.

Behind the beach ran a strip of woodland—cedar thickets backed by most alluring glimpses of gray-green tamarac and dark spires of spruce. As we approached this cover we found the sand slopes carpeted with Trailing Jupiter, and in the wet hollows were patches of the pretty little *Selaginella apus*, spikes of Zygadenus, Tofieldia and Indian Plantain, clusters of Fringed Houstonia, for the most part white or faintly flushed with violet; and to cap it all, on the edge of the cedars, quantities of Butterwort and Dwarf Iris.

Back of the cedars, as we had suspected from the tamarac and spruce, we found a series of rich little sphagnum bogs which, besides adding the rare and local *Selaginella selaginoides* to our treasure-trove, brought the number of orchids noted by us during the trip to a total of 28 species. These included the Heart-leaved Listera; and it was while following its trail from the open sphagnum up through some thickets of cedar that we suddenly came across a big solid bed of Broad-leaved Twayblades.

They were growing so thickly that we had to make a detour to avoid treading them underfoot. They had evidently found ideal conditions to grow in; the plants were very luxuriant, and we found their colonies established along a whole mile of these woods. They were most abundant in low wet floors of leaf-mould under

deciduous trees; occasionally they ventured up into the hardwoods along the banks of streams, and still more often made their way down into the cedar thickets below. Among their plant companions, besides the kindred Heart-leaved, were the Bracted Habenaria and all three of our northern Coral Roots, Striped, Spotted, and Early. To find this unusual Twayblade so abundant within a day's drive of home was indeed a delightful surprise.

VI. KIDNEY-LEAVED TWAYBLADE

(*Listera reniformis*)

NAMES: COMMON: Kidney-leaved Twayblade, Small's Twayblade, Gypsy-witch. SPECIFIC: *reniformis* (Small, 1897), "kidney-shaped," of the leaves.

PLANT: STEM: slender, 4–6 or 7 in. high; peduncle and rhachis puberulent. LEAVES: rather dark green, kidney-shaped, $\frac{3}{4}$ x $\frac{9}{16}$ in., mucronate. SPIKE: few-flowered (3–7), long-pedicelled.

FLOWERS: Pale yellowish or whitish green with reflexed perianth and oblong-lobed lip-base. SEPALS: lance-linear, pale, much as in *L. convallarioides*. PETALS: similar. LIP: whitish, about $\frac{1}{3}$ in. long, wide obovate to round-cuneate; oblong-lobed at base; dilated at apex and deeply cleft into a pair of divergent round-oblong lobes, toothed in the fork.

PLACE AND TIME: DISTRIBUTION: Pennsylvania south through Maryland and Virginia to North Carolina. HABITAT: wooded mountain slopes; in damp shaded thickets of "laurel," often bordering on runnels. SOIL PREFERENCE: strongly acid, sometimes found in sphagnum under its favorite rhododendrons. SEASON: June-July.

SPECIAL FEATURE: Lip large, oblong-toothed at base, round-cuneate and deeply cleft at apex.

THE Kidney-leaved Twayblade was first described by Dr. Small about thirty years ago (1897). Like the Northern and the Auricled, it occupies a distinct little niche of its own in the wide-lipped group. It is peculiar to mountain slopes, and ranges with us from Southern Pennsylvania to North Carolina. Curiously enough, though unknown in our west, it reappears in eastern Asia.

The plant is small and slender, seldom exceeding a height of 6

Plate 64

KIDNEY-LEAVED TWAYBLADE

(*Listera reniformis*)

or 8 inches. The leaves are rather dark green, wider across than from base to tip and sharp-pointed. The flowers are very pale green with a whitish or even creamy tinge; the sepals and petals are strongly reflexed, and the lip has the watery translucence so characteristic of the group. It is boldly toothed at the base with a pair of oblong projections and widened out on the apical half into a pair of divergent lobes, oval in shape and divided by a deep cleft.

We got our first sight of this Twayblade in the mountains of North Carolina. Our visit was very short and hurried, a mere week-end lull between fire-baptism with the Spreading Pogonia farther south and the Crested Coral Root in Tennessee. But to hob-nob with it at all was an exquisite pleasure, and one we hardly dared even dream of till we came to plan our campaign the winter before. The Twayblades, by the way,—just a whisper in a friendly ear—have always been a favorite group with us; and this meeting with Small's rounded up the last on Gray's list.

Our headquarters were right in the mountains at an elevation of 4,000 feet above sea-level. From there we climbed three miles of State road through magnificent mountain scenery; a steady upgrade all the way, just too steep for a Ford to take on high. As in the Pennsylvania mountains, the slopes and valleys were densely wooded; miles and miles of laurel thickets—how the rhododendron loves to climb! It swarms as lustily up our mountainsides as Hooker found it doing in the Himalayas.

Until this trip we had had a kind of sneaking notion that we knew all about rhododendrons. But the things we learned in a five hour heart-to-heart talk with Grandfather Mountain among those "laurel" thickets would fill a book. You couldn't see over them, or even through them for more than a yard or two in any direction; in spite of the steep pitch, which of course gave one the general direction, it was impossible to recognize a given contour of the slope when you had reached it, or to know in case of deviation whether you had swung to left or right of a given

point; and once you had found your mark, woe betide you if you ever left it. In running a vertical back to the road for our camera we actually lost our first colony of the Twayblade, and it cost us a long hard search with packs on our backs to find it; and then, in wandering a few yards off in search of some better plants we had noticed, if we didn't lose it a second time for nearly two hours and our camera with it! After that we blazed every foot of the way between stations and back to the road.

Our directions at the start-off had seemed so delightfully clear, we thought we should have no trouble in finding the plant: "under rhododendrons, across the road from McRae's"; what could be simpler? Leaving our coats and packs at the road we plunged into the thicket quite confident of almost immediate success. The whole morning went in fruitless search; we must have examined every green thing in many acres, and crawling for hours through dense shrubberies well over one's head was no easy task; some plants of Lesser Rattlesnake Plantain were all our reward. Finally we decided to strike out boldly for ourselves and keep going till our line of search tapped greater extremes of shade and moisture. So down-hill we went, down and down, till we were afraid to think of ever climbing up again. At last we passed through an intermediate belt of comparatively open mixed woods, and then down once more into a lower stratum of laurel even denser than before.

Here, for the first time, we found wet gravelly spots where baby springs came to the surface and met to form tiny streams. It was evidently the moisture that made the rhododendrons grow so rank; we had to fight and crawl and chop our way with hatchets through the tangle. And then, stooping to drink at a clear spot in a shallow runnel, we set our hand down beside a plant of *Listera reniformis!* Wet places—this was a new idea!—the station opposite McCrae's, never known to fail before, had been dry. It was nowhere abundant; indeed, as the event proved, it was decidedly "spotty" and local; but here and there, scattered about in ones

and twos, and always close beside these trickles of moisture, we found it in satisfying quantities.

It was a difficult flower to get a good picture of because both lip and leaves stood out horizontally, presenting a mere edge instead of their face to the camera. But to the eye roving at will over them they showed all kinds of interesting features, and we doubt if we have ever enjoyed more the sight of a new Twayblade than we did that day in the southern mountains. No wonder it was thought for years to be *Listera convallarioides*; it has the same wide lip, wedge-shaped and cleft at the apex into a pair of rounded lobes; the cleft, however, runs much deeper and more to a point, and the lobes are narrower—in outline like the wings of a resting fly. The leaves, as the name *reniformis* implies, are kidney-shaped rather than rounded or ovate.

A curious thing that we had never noticed before about the Twayblades struck us very forcibly in looking at this plant: the stem proper ends at the leaves; and all above that is flower-stalk —a peduncle, strictly speaking, with a series of pedicels above for the separate flowers. Hundreds of little seedlings were in evidence all about, terminating always at the leaf and with nothing developed beyond. In mature plants, the stalk above the leaves was noticeably slenderer and more delicate than the part below and showed traces of glandular pubescence instead of being smooth.

Altogether, with its ups and downs, its humors and tribulations, prolonged effort and final triumph, the trip was entirely characteristic of our orchid-trails and a most welcome addition. When we got back to headquarters at the end of it all we were utterly exhausted, satisfied, happy.

V

CREST-LIP (*POGONIA*)

ROSE POGONIA

(*Pogonia ophioglossoides*)

NAMES: COMMON: Rose Pogonia, Rose Crest-lip, Beard flower, Snake Mouth. GENERIC: *Pogonia* (Jussieu), "Beard" flower. SPECIFIC: *ophioglossoides* (Linnæus), "like the Adder's Tongue fern," from the stem-leaf.

PLANT: STEM: 8–15 in. high, scape-like, lax. LEAVES: 2–3, often a long-stalked leaf at base, and always midway up-stem a lance-oval leaf 1–3 in. long, and at top a leaf-like bract.

FLOWERS: Pale rose to white, 1 in. long, solitary, fragrant. SEPALS: narrow-oval, ¾ in. long. PETALS: obovate, somewhat shorter and wider. LIP: pale pink veined with rose-red and bearded with a 3-ranked brush of short fleshy hairs tipped with yellow-brown; ⅔ in. long, spatulate—narrow-oblong below, roundish and fringed above.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England west to Minnesota. South to Florida and Gulf States. HABITAT: wet, open bogs and muskegs, in moss or among sedges. SOIL PREFERENCE: strongly acid, sphagnum-loving. SEASON: March–May in south, June–August farther north.

SPECIAL FEATURE: Stem one-leafed at middle, sepals and petals alike.

THE Common Snake Mouth or Rose Pogonia is one of the bog-trotter's earliest acquaintances and always a favorite, being linked up in the mind with hot July days and the mossy heart of tamarac bogs. With the Grass Pink and the Dragon Mouth (*Arethusa*) it forms a little group of strikingly beautiful orchids, in a tribe not otherwise remarkable for showy flowers. It is thoroughly hardy and in many a northern bog may be found by the thousand. Its name of Pogonia or "Crest-lip" is due to the brightly colored brush of fleshy hairs on the face of the lip.

It is a delicate little plant with fleshy-fibrous roots and a slender swaying stem 6–12 inches in height. Half-way up is an oval leaf closely resembling that of the Adder's Tongue Fern (*Ophioglossum*). At the top nods a leafy-bracted flower about the size of a snowdrop, pale flesh-pink, occasionally pure white, and deliciously fragrant.

The sepals are narrow-oval, the petals rather broader. The three upper parts of the perianth are somewhat erect or ascendant and loosely grouped together; the lateral sepals are more spreading. The lip is tongue-shaped and somewhat spatulate; it is crested on the face with a three-ranked brush of fleshy white hairs tipped with yellow-brown, and the apical margins are fringed on the edge and veined with bright rose.

There is a delicate charm about this flower of almost universal appeal. Like its relative, the Arethusa, it seems by its single blossom and suggestion of a face to have a strange power of attraction that sprays and racemes lack. Everything about it is instinct with modesty, the drooping habit, the softness of color, the delicate fragrance. This last is hard to define; it has been likened to raspberries, to violets, to the Fragrant Fern, and even (by Thoreau) to snakes! Along with its sweetness it seems to convey a subtle something peculiar to orchids. Our very first whiff of it, we remember, suggested Yellow Lady Slippers—with a difference; it even suggested rich peat bogs and sphagnum; in a word, it smelled exactly like Rose Pogonia and nothing else.

And there's husbandry in it all; it doesn't waste its sweetness on the desert air. By color and scent the roving bee is wooed from afar; on the crested lip it finds foothold and purchase. It pushes into the low-roofed nectary-entrance, pressing tight shut, as it passes, the lid overhead of the fairy pouncet-box in which the pollen is stored, and getting, from the sticky disc of the stigma just beyond, a friendly rub-down between the shoulders that takes every speck of dust from its coat. A heartily welcome guest, it takes its sip of nectar and starts to retire. But the backward move-

Plate 65

ROSE POGONIA

(*Pogonia ophioglossoides*)

ment at once releases the catch of the pouncet-lid which is hinged on the outer side; down it swings and a liberal pinch of King Oberon's snuff is dusted over the bee all ready for the next rub-down.

The Snake Mouth loves rich juicy sphagnum bogs and thrives best in thoroughly saturated spots, not under trees but in open spaces too wet for anything but small tamarac and black spruce to find a foothold. Where stretches of open bog are slowly drying into "prairies," the Pogonia often outlives the sphagnum and blooms profusely in the shelter of coarse herbage and heaths. It will be found, however, as year after year the drying process advances, that the Pogonia dies out before its almost constant companion the Grass Pink (*Calopogon*). We know of several bogs that within the short span of personal acquaintance have lost their once abundant beds of Rose Pogonia. Arethusa and Calopogon still survive, thanks in the main to a "radical" difference in habit; the bulb of the one living in soft surface moss and maturing its flower when the bogs are still lavish of moisture, while the storage corm of the other enables it to tide over long spells of drought and its tall stem lifts the blossoms high above the smothering undergrowth.

Our earliest memories of the Rose Pogonia carry us back to the first big muskeg we ever saw. A country boy in our northern hunting-grounds brought us one day a bunch of Pitcher Plants and Moccasin Flowers to be named. By no sort of coaxing could we prevail on him to tell us where they grew but we finally ferreted out the presence of a "mud lake" not far from the farm that he lived on; so, "bright and early" one July morning, with a priming of lunch in our botany cans and hearts full of eager excitement, off we went to explore.

A novel experience is not easily forgotten, and the first sight of new flowers makes an impression well-nigh indelible. We know this "mud lake" so well now from end to end and all about, that it is curious to hark back to a time when it was absolutely strange.

We kept wondering on the way, whether the name stood for a lake of mud or a stagnant pool or what.

In point of fact it proved to be a happy union of peat bog and mountain tarn, and it was a most delightful surprise to emerge suddenly from dark tangled woods into full view of a sparkling lake with water-fowl, floating lilies and blue pickerel weed about its surface. It was wooded all round; on one side, to the water's edge; on the other three, with wide margins of floating bog.

At first we were quite chary about venturing over this unstable surface, and trod pretty gingerly; for the ground quivered under our feet and if we stamped it set the cedars and tamaracs rocking quite a distance away. But it proved perfectly safe and we soon got over the uncanny feeling. The lake was apparently too shallow to swim in, but deep enough to drown one a dozen times over. At the point where we reached it there seemed to be about two feet of water, but without blinking it swallowed a twelve-foot pole and then asked for more; below the water lay a thin gruel of peat solution several yards deep, and below that again a stodgy porridge of black muck; it was indubitably a mud lake.

This floating bog and its woodland girdle came to be one of our happy hunting-grounds in those early days of botanizing. Here we made our first acquaintance with many of the heaths —trailing vines, shrubs, and flowering herbs, a wealth of bog plants like Buck-bean and Arrow-grass, and no fewer than seventeen kinds of orchid. It was at the foot of the lake that the Rose Pogonias grew, among dainty wreaths of Cranberry, in a half-acre of rich open muskeg that was dotted about with Grass Pinks, fragrant spikes of White Habenaria and a few tall stems of Prairie Fringed.

They were very abundant, these Snake Mouths, flowering just after the Arethusas, when the Yellow Lady Slippers were giving place to Big Pink-and-Whites. We do not remember ever to have seen them in greater luxuriance; the steamy heat of the floating bog was just what they seemed to need; and the sight of them in that glorious company drew us to the spot time and again.

VI

FUNNEL-CREST (*CLEISTES*)

SPREADING POGONIA

(*Cleistes divaricata*)

NAMES: COMMON: Spreading Pogonia, Spreading Crest-lip, Funnel-crest. GENERIC: *Cleistes* (L. C. Richard), "folding" or "funnel" in allusion to the form of the corolla; SPECIFIC: *divaricata* (Linnæus), "wide-spread," of the sepals.

PLANT: STEM: 1–2 ft. high, single-leafed at middle and with a solitary bracted flower at summit. LEAVES: lance-oblong, clasping, 2–4 in. in length; floral bract lanceolate.

FLOWERS: Pale pink to white veined with brownish, nearly 2 inches long. SEPALS: dingy brown, lanceolate, 1½–2 in. long, wide-spread to recurved. PETALS: flesh-colored to white, 1–1½ in. long, lance-ovate, connivent, overarching the lip. LIP: white, brown-veined on upturned lateral walls; central floor prolonged, somewhat 3-lobed and crenulate; median line adorned with a narrow grooved and ridged fleshy crest.

PLACE AND TIME: DISTRIBUTION: New Jersey and Delaware south to Florida and Alabama. HABITAT: borders of bogs and swamps. SOIL PREFERENCE: Intense acidity, same as Whorled Pogonia and, like it, often on dry wooded hillsides. SEASON: April and May in Florida, June–July in north.

SPECIAL FEATURE: Stem one-leafed at middle, sepals and petals different.

THE Spreading is the largest and most striking of all our Pogonias or Crest lips. It owes its name to the long narrow sepals being wide-spread (*divaricata*) and drawn back from the rest of the flower. It has never been found farther north than New Jersey where it is extremely rare.

It ranges from one to two feet in height and like the Rose Pogonia has a leaf near the middle of the stem and a bract at the summit; the leaf is oblong-lanceolate and the bract narrow, sharp-pointed and almost erect. The sepals are nearly 2 in. long, linear-

lanceolate, and dingy brown in color; the lateral pair boldly recurved, the upper one erect. The petals are arched straight forward over the column and basal half of the lip, their tips forming an upturned peak; they are pale mauve-pink to white in color.

The lip is boldly 3-lobed, the widely dilated margins of the basal two-thirds being turned up to meet the over-arching pair of petals—like side-walls supporting a vaulted roof, and the floor or central part of the lip projecting below in a wedge-shaped threshold rounded at the sides and prolonged into a triangular tip. It is whitish in color, veined on the upper or inner surface with brown-purple, the interlacing network being particularly noticeable on the upturned basal wings; the face of the lip is crested along a narrow line down the middle.

The withdrawal of the sepals and the connivence of petals and lip to form a conspicuous full-throated more than inch-long funnel with jutting platform at the mouth of it are a striking example of how orchids go half-way to meet the insects on which they rely for cross-pollination.

In general, it frequents swamps and wet pine-barrens, sometimes appearing at the outer edges of marshy tracts and open bogs—stations too dry for its sister the Rose Pogonia, though not for the Crested Orchid which has more than once been found in close companionship.

We got our pictures of this big Pogonia on one of the most trying trips we have ever had. It represents our farthest south; in little more than a week we had to track down a trio of rare orchids at three quite separate stations. The conditions of travel so far from home were bound to be adverse; as a precaution against the dreadful southern "jigger" we had to lug hip-high top-boots about with us everywhere, and pepper-and-salt all the clothes we wore so thickly with chemicals that to this day silver coins dropped into the pockets turn black in the face from flour-of-sulphur. To add to our troubles a perfect tidal wave of heat

Plate 66

SPREADING POGONIA

(*Cleistes divaricata*)

Plate 67

SPREADING POGONIA

(*Cleistes divaricata*)

had just swept over the region. How the photographer carried on through it all is a mystery; that he yet got all three was due to his strategy in sandwiching the mountain quest of Small's Twayblade between two grilling sun-blistered tramps in search of the Spreading Pogonia and the Crested Coral Root.

We had already lost a day through the heat when at last we found ourselves in sight of the little swamp marked on our sketch map as the home of the Spreading Pogonia. Like the rich bogs of New Jersey, it was not wooded in the sense of supporting forest trees, but abundantly overspread with thickets and shrubs—ideal cover for orchids. We found it very rich with flowers, blooming in almost tropical luxuriance; but we simply didn't dare turn aside for anything till we had made sure of our plant and our pictures.

Temptation in its most alluring form stood right in our path at the entrance to the bog. In all the *flora* of North America there is nothing we would sooner "fall for" than *Abama montana*, one of the Bog Asphodels. Like its cousin in Great Britain it is closely akin to the true Asphodel,—a name hallowed by 3,000 years of human flower-worship. We had noticed the seed stalks of a sister species in New Jersey but had never thought we should see it in flower; and here it waylaid us in North Carolina; a most interesting form of "yellow lily," and carrying for us, besides, the romance of other days and other trails.

We found the bog itself crowded with Pipewort stems and spikes of Sticky Tofieldia; but the Pitcher Plants were the most delightful surprise of all; not only was our familiar Purple "Side-saddle" in the height of its bloom everywhere but the place fairly bristled with tall trumpet-shaped cups of an entirely strange kind resembling the Southern. Horned Bladderwort was flowering here and there, and Yellow-eyed Grass in abundance. Among orchids, Grass Pink was very common and the Rose Pogonia in thousands, but not a sign to be seen of the Spreading.

After a general search of open areas and thickety borders, we

began to work systematically, beating back and forth in close scrutiny over every square foot of ground. This almost at once produced results—a single plant, but to our consternation, with the blossom entirely withered so that it fell to pieces at a touch. Our hearts sank into our very boots; we had been warned that the heat wave had forced the flowering season in the south two weeks ahead of time. However, we persevered until we had worked nearly all round the bog, in thickets and up every likely-looking open space, entirely without result. It was very hot; there seemed to be no life in the air, and before long we should actually have to hustle off to the wayside station for our train. And then, all at once, the luck changed.

We were just skirting past a big log when right under our hand appeared a plant with a fine bloom surmounting the long stiff two-foot stem. We saw at once what the trouble was: we had been working too close to the wet edges. This put new life into our weary limbs, and we went at it again with almost a feeling of confidence; our next discovery was a plant with no blossom at all, but that was such an obvious bluff that it failed to daunt us, and in a few minutes we were right in the midst of them,—perfect blooms, first two, and then in a comparatively small space, twelve or fifteen more.

Time pressed and the sky was already thick with clouds, so the camera was brought into play at once. The results, in the severe judgment of our photographer, were only fair; so back we came next day and got some really good set-ups, considering how full-blown the blossoms all were in the phenomenal heat. Indeed, Fortune was very kind, allowing us even to carry away on the last two plates a portrait of our beloved Bog Asphodel.

The pictures show pretty clearly what the camera thought of the Spreading Pogonia, but what were our impressions? At first, we admit, a sense of disappointment; they were certainly "Pogonias," you could tell that as far away as you could see them; but where was all the charm of the dainty little Rose Pogonia,

demure and modest, with its soft shade of pink and its delicate fragrance? When, however, we began to look at them for themselves, a growing sense of admiration followed. Here they stood, just exactly filling a niche that no other orchid could fill. Where the Rose Pogonia fell back dismayed in the face of certain death by parching or suffocation, there the Spreading seized hold and, interlocking below with hard-compacted root-masses of Cinnamon Fern, raised its tall standard high above the level of even the Grass Pinks.

By adding nearly a cubit to its stature and enlarging its blossom, the plant has been able to get along with more or less neutral colors and to put its sepals to a new use, perhaps, during inflorescence—that of throwing into relief and balancing the corolla; there they stand none too gracefully behind the big horizontal funnel of the lip, with its jutting platform of an apical lobe and its upturned sides roofed over by the pair of petals. At their prettiest these are of the same delicate pink as the Rose Pogonia's; and they combine with the large curiously shaped lip—itself white and conspicuously veined with purple—to form a flower both striking and, in our final appraisement, handsome.

VII

WHORL-CREST (*ISOTRIA*)

I. LARGE WHORLED POGONIA

(*Isotria verticillata*)

NAMES: COMMON: Large Whorled Pogonia, Large Whorled Crest-lip, Whorl-crest, Ettercap, Green Adderling, Five Leaves. GENERIC: *Isotria* (Rafinesque, 1838), "with three equal" parts, the sepals like the leaves forming a symmetrical whorl. SPECIFIC: *verticillata* (Muhlenberg, 1805), "whorled"—from the position of the leaves.

PLANT: ROOTS: including several underground runners, 6–12 in. long, dark and fuzzy, with pale soft-nosed tips that spread through moss or humus. STEM: 6–12 in. high, pale purple dusted with gray bloom, stout-fleshy, hollow, naked, surmounted by leaf whorl and axillary flower. LEAVES: 5, occasionally 6, in a whorl, ovate, sessile, broad-based, pointed; 2 in. long.

FLOWERS: Pale yellowish green, nearly 1 in. long; solitary or two, on long pedicels (½–1¾ in. long), funnel-shaped. SEPALS: pale below, brownish above, linear, spreading and recurved, 2 in. long; tapering forward with sides curled up and spiralled. PETALS: yellow-green, nearly 1 in. long, lanceolate, arched together over the lip's upturned basal wings. LIP: yellow-green, about 1 in. long, trough-shaped and 3-lobed; lateral lobes upturned, purple-streaked; central floor prolonged into a whitish rounded platform, wavy-edged; median line crested with a flattened waxy ridge of greenish-yellow, with two large orange spots at base, and knobbed at apex.

PLACE AND TIME: DISTRIBUTION: southern New England in east to Florida, west to Michigan, Arkansas, and Texas. HABITAT: damp or dry deciduous wood-floors and sphagnum beds of wooded bog borders. SOIL PREFERENCE: strongly acid. SEASON: May and June.

SPECIAL FEATURE: Flowers long-sepalled in the axil of the leaf-whorl.

THE Whorled Pogonia or Crest-lip is so unique in flower and foliage that orchid-hunters familiar with the dainty little Rose Pogonia would go a long way to see this much rarer sister with her emerald ruff of five leaves and fantastic coiffure of greeny brown sepals. A novice might easily mistake a small

Plate 68

LARGE WHORLED POGONIA

(*Isotria verticillata*)

LARGE WHORLED POGONIA

(*Isotria verticillata*)

plant of it for the Medeola or Indian Cucumber; but the stem, instead of being thin and wiry, is stout, soft-fleshy, and hollow. It is peculiar to the east like the rest of its group, and shows much the same "southern preference" as the Three Birds. The only station known for it in Canada—close to Lake Erie—has long been destroyed.

The stem, usually 8–10 in. high, forms a naked scape crowned at the summit with a whorl of five leaves surrounding a long-pedicelled flower. This is yellow-green in color and fashioned like that of the Spreading. The 2-inch sepals are drawn back with the straggling effect of wavy ribbons—or sprawling legs to judge from its nickname of "Ettercap" or Spider. The corolla is thrust forward in the shape of a funnel, its upper half formed by the pair of over-arching petals. The lip is three-lobed and trough-like, the lateral margins upturned, the central part prolonged into a wide-rounded apical platform separated from the side walls by V-shaped clefts. The ornamentation of the lip-floor is quite peculiar; it is roughly crested down the middle with a flat-topped greenish-yellow ridge of waxy-looking material; at its base lie a pair of conspicuous orange spots and flanking it on each side a series of dull purple streaks.

The true home of this orchid would appear to be rich moist woods; and though, as far south as Washington, we have usually found it in somewhat dry situations—often quite abundant,—it seemed reduced in size as if lacking vigor. In New York State, where the plant approaches its northern limit, it seeks a damp cover; sometimes about low rich woods, but preferably in the interior of wet mossy bogs. It seems to have a special liking for the edges of thickets and shrubberies where it nestles in soft sphagnum, often alongside the little Southern Twayblade (*Listera australis*). We have noticed that at many of these stations the Virginia Chain Fern is remarkably abundant, sending its long underground runners this way and that through the moss, in much the same fashion as the Whorled Pogonia itself. Like its

cousin the Rattlesnake Plantain it does not always bloom very freely; you may often count a dozen sterile leaf-whorls for every one with a flower. In our part of the world it is quite a rarity, and it was therefore a very great delight to us to find it abundant about a piece of swamp in Cayuga County, known to "the brotherhood" by the appropriate name of Featherbed Bog, from its deep carpet of soft sphagnum.

It was actually not till 1925 that we of Ontario got our first sight of the Whorled Pogonia in flower. A very lucky combination of events in the opening week of June gave us five days' holiday at a stretch. Forewarned is forearmed, and for a whole month in advance we kept cudgelling our brains to plan a trip that should be really worthy of the occasion. When the time came, it brought with it a heat-wave, one of those phenomenal weeks with which June sometimes opens, beginning with a modest 86 degrees in the shade and ending with 98 degrees. In spite of all, we carried our plans through with flying colors, a perfect triumphal procession including the Putty Root, the Lily-leaved Liparis, and the Southern Twayblade.

The trip culminated in a visit to the famous Mud Pond at Zurich. We had already got an inside acquaintance with this remarkable bog some summers before, and what we had seen of it filled us with eager longing. It was the very double of our old Lombardy Mud Lake,—the first and almost the richest orchid bog we ever stepped into. The discoveries of that far-off time could never happen again; but here at Zurich we were much nearer the Sunny South; the vegetation was incomparably richer, and almost anything seemed possible where the magic of that early haunt so uncannily renewed itself at every turn. There were the same enfolding woods and hidden lake, the thickets of alder and holly, the moist sphagnum beds and sedgy glades, the open stretch of heaths and winding paths of mystery.

We had been directed to a spot within easy reach of the old wooden tracks by which florists drew out their loads of moss; it

lay in the heart of the bog near the west margin of woodland. We had never seen the flower before, but we carried along to guide us in our search a mental picture of the stout fleshy stem and circlet of leaves. Unfortunately, the season was backward and for a long time we could get no trace of what we were looking for. Experience, however, quite unexpectedly came to our aid; we had tramped very similar orchid covers for years and so persistently that our eyes were used to practically all kinds and stages of the growth with which these floors are carpeted. We hadn't been searching long before we began to notice repeatedly something in the familiar verdure that was entirely new to us—quantities of little cone-heads only an inch or two high like tips of stunted Horsetails.

Carefully digging up two or three of these strange-looking buds, we discovered at their base a tuft of fibrous rootlets and several thick fuzzy root-cords extending a foot or more horizontally through the moss and peat; these terminated in whitish soft-nosed growing tips similar to the runners of Virginia Chain Fern or the Alpine Cystopteris. In order to examine the buds carefully, we carried them to a sunny glade and almost immediately got double proof of what they were; for dissection showed the cone to be an embryo whorl of five leaflets, and we presently found in a corner of our glade some much more advanced plants with the leaf-whorl expanded and a young flower bud standing up in the centre.

It was a great moment, and in it all the aches and pains of heat, drought, fatigue, and mosquitoes fell away and our whole being seemed suddenly flooded with a sense of the richness and beauty of the surrounding scene. We were standing under a big shrub of Azalea in full flower and about its beautiful "pinkster" blossoms hovered great black and yellow Swallow Tail butterflies (*Papilio cresphontes*). Not far off, the thickets of holly and alder gave place to forest trees and a luxuriant growth of Cinnamon Fern; rose-pink Moccasin Flowers were everywhere;

among the immediate companions of the Whorled Pogonia we noticed great quantities of Gold Thread, Wintergreen, Starflowers and occasional Indian Cucumber (*Medeola*); Cranberry and Stiff Club Moss (*L. annotinum*); also, shrubs of Honeysuckle and High-bush Huckleberries; a scattering of Maple and Ash, besides Tamarac, Spruce and Pine; of orchid kin, almost side by side with our new find stood the Southern Twayblade in full bloom, young spikes of Small Green Wood Orchid, Grass Pink, and Rose Pogonia. Once in a while out of the depths of the wood beyond came the rich crowing call of a cock pheasant—a sound we had not heard for many a long year.

But not a flower of the Whorled was to be seen anywhere; even the buds were rare and so small that we judged them a week or ten days short of opening. After a long hard search both north and south of the path, we were forced to give it up.

Just as we approached the east fringe of woods on our way to the roadside spring, a happy thought struck us; and no sooner had we refreshed ourselves with a long cold drink than we proceeded to put it into execution. We had noticed a tract of thin woodland on this side of the bog that got two or three hours more of afternoon sun as well as being open to the morning beams. Such extra daily doses of even slanting rays should make a big difference to this hotbed growth. Our success was complete. Within a hundred yards of the trail we found a wide tract where colonies of the Whorled flourished and among them a dozen or more of blossoms fully out. There was not much Gold Thread here, but abundance of Wintergreen, for which the Pogonia seemed to have a fondness; otherwise the plant companions were the same as we had noticed farther west.

The biggest colony was situated at the base of a clump of maples, surrounded by a scattering of trees both deciduous and evergreen. The plants were all growing among dead leaves and sphagnum in fairly dry conditions, the roots of the trees having slightly raised the floor on which they stood. They appeared

lusty and strong, a very high percentage of the colony preparing to bloom. It was a delightful surprise at the end of our long fruitless search and we certainly made the most of it. Between evening of that day and noon of the next we had worn a well-trodden path to this haunt of the Whorled Pogonia.

II. SMALL WHORLED POGONIA

(*Isotria affinis*)

NAMES: COMMON: Small Whorled Pogonia, Small Whorled Crest-lip, Little Whorl-crest, Little Five-Leaves, Fairy Frill. SPECIFIC: *affinis* (Austin, from Gray, 1867), "kindred" *i. e.*, to *Is. verticillata.*

PLANT: STEM: 3–6 in. high, pale green with gray bloom, stout, fleshy, hollow. LEAVES: terminal in drooping whorl of 5 or occasionally 6, pale green, lance-ovate, pointed, 1–1¾ in. long.

FLOWERS: Pale yellowish green, solitary or often two, short-pedicelled (1/16 in.), about 1 in. long. SEPALS: light green, lance-linear, slightly curved, moderately spreading, about 1 in. long. PETALS: yellowish green, obovate, over ½ in. long, arched over the lip. LIP: yellow-green like the petals, nearly ½ in. long, irregularly oblong-oval, three-lobed, expanded at sides into a pair of upright wings obliquely pointed at tip, central body prolonged into a wedge-shaped platform and overlaid with waxy gutterings of yellow-green.

PLACE AND TIME: DISTRIBUTION: very rare and local; recorded at a score of places in New England, New York, Pennsylvania, New Jersey, Maryland, and Virginia. HABITAT: rich deciduous woods in situations somewhat dryer than those frequented by *Is. verticillata.* SOIL PREFERENCE: strongly acid. SEASON: May to early June.

SPECIAL FEATURE: Flowers short-sepalled in the axil of the leaf-whorl.

THIS is one of the rarest and most intriguing of orchids. It was first found in 1867 and named *affinis* (kindred) to mark its close affinity with *Isotria verticillata.* Since then it has been recorded at a number of diverse points from New England to Virginia; but nearly always in colonies so small that it has been next to impossible to study the plant through successive seasons. Few botanists have actually seen it growing, and consequently theories have obtained that don't for a moment fit the facts. No one who has ever seen the two plants together could doubt

that the Small Whorled was a genuine species quite distinct from the Large.

It is only about half the size and its stem is differently colored; the leaves are more conspicuously drooped, paler, and tapering gradually to a point instead of abruptly. The flower is almost sessile, and its perianth parts, as in the Rose Pogonia, are all together and much alike. The sepals are uniformly pale green and only half as long again as the petals instead of two or three times their length. The lip lacks both the deep-purpled stripes and the orange spots so conspicuous in the Large Whorled; its outer end is guttered at the sides with an overflow of yellow-green waxy gobs from the crest; and the pair of oblique bays behind the apical lobe, instead of forming a wide V, are narrow U-shaped.

At one of the largest stations known for it, where the colonies have been under observation for several seasons, the plant appears to make its home in flat rather dry thin woods of deciduous trees. Here it is nearly always found occupying little open spaces and having its roots intertwined among rotting vegetable fibre. Both species grow in the same woods, but never intermingled; the Small Whorled maintaining itself jealously in little independent colonies that begin to bud out when the last of the Large Whorled are already fading away.

We had known of this station for some years, and on one of our trips had actually held ourselves in readiness to pay it a flying visit; but at the last minute the auspices proved unfavorable. In 1925, however, we got word that this almost unique station for *Isotria affinis* was in danger of extinction and it must be "now or never." Experts on the spot—all gratitude for their friendly spirit!—kept us posted as near as might be on the probable date of flowering, and on April 28th we set out to motor from Buffalo into Virginia.

It needs a very delicate adjustment of plans in this work-a-day world to hit the happy hour when a very rare orchid at

SMALL WHORLED POGONIA

(*Isotria affinis*)

Plate 71

SMALL WHORLED POGONIA

(*Isotria medeoloides*)

a great distance elects to bloom. We were actually stepping into the car when a telegram was handed to us—"*verticillata* fading, *affinis* not yet in sight; better wait a week or two." Very well! but not in Buffalo; we'd wait in Virginia, and, if need be, on the very edge of the woodland cover where the Small Whorled was getting ready to flower.

Our journey was one long delight. To nature-lovers nothing in all the year can compare with the glorious thrill of the coming of Spring; but in the Lake Region she comes with halting foot and only after many weeks of weary waiting; now, bowling along the open highway, with our car headed due south, in a mere matter of hours we rushed right into her arms. We left Buffalo still winter-bleached and with a frosty tang in the air; and on the second day, wonder of wonders, we were in a land of green leaves and flowers, with apple orchards bursting into full bloom, peach and cherry trees a mass of blossom everywhere, grass well grown and side-hills foamy with bluets.

To cap this miracle of April and June holding May-day festival together, we had all the glories of mountain scenery; for our route took us through Pennsylvania and Maryland, across the Alleghanies and into Virginia by the famous Shenandoah Valley. And all the time, to give spice to the trip, at the back of our minds lay the sense of a special objective, a pretty little problem to be solved in this quest of a rare new orchid: "*affinis* not yet in sight; better wait"; what could this mean? Was it still expected? and if *Isotria verticillata* was already fading didn't that prove them different?

A few days later and we were realizing one of the orchid-hunter's wildest dreams—the sight of several colonies of *Isotria affinis* coming into bloom in a wood where hundreds of *Isotria verticillata* were already ripening their seed-capsules. The cover was a rich mixed wood, rather thin and level-floored; the trees mainly white oak, beech, tulip and chestnut, with abundance of flowering dogwood, sweetgum, holly, and occasional loblolly pine. Altogether it was as "likely" looking a bit of rich southern wood

as we had ever seen; and the vision of hidden treasures made us fairly frantic to explore.

Within its borders we found many Stemless Lady Slippers in full bloom, Lily-leaved Liparis just coming into flower, Green Adder's Mouth in tight little buds, hundreds of Crane-fly leaves, and some foliage patches of Downy Rattlesnake Plantain. But there was so much to do at this golden hour of the two Whorled Pogonias flowering together that we shut our eyes heroically to every other lure.

Both of them seemed to prefer rather dry stations and a flat floor to grow in; and *Isotria affinis* had a quite peculiar fondness for little open spaces. In all the many colonies of *Isotria verticillata* we never saw a single plant of the Small; and in or near the three colonies of *Isotria affinis*—twenty-four plants all told—no trace of the Large was to be found. Not only so, but *Isotria affinis* was constant and self-perpetuating; for we could trace its life history through three or four seasons without a break, by the presence among its flowering plants of stems and pods from a previous year, and tiny seedlings too young as yet to bloom.

This seemed to prove beyond question that the Small was neither a "sport" nor a "throw-back" of the Large, but a genuine and quite distinct species of Whorled Pogonia. And here both of them were, growing side by side, so like and yet so different. The more robust and numerous Large Whorled were two or three weeks ahead in their season. Throughout the cover, we couldn't find a single plant that was still in the freshness of its bloom, nor one of the Small that was yet fully open.

The biggest colony of all had fourteen plants; it occupied a little glade on the level floor of the wood, with a stump in the near background that saved us the trouble of blazing the spot. Among the surrounding vegetation we noticed a few hollies, a grape vine or two, and some Christmas Fern; also, just to remind us this was an Earthly Paradise,—a luxuriant bed of Poison Ivy. An insignificant spot, you will say; but never to be forgotten,

for here we first set eyes on the Small Whorled in open bloom.

It is curious how seldom the mind's eye succeeds in picturing a strange plant correctly according to form or scale; and this in spite of conning carefully over book descriptions and comparative tables of measurement. How well we remember the surprise and even disappointment of our first *Orchis rotundifolia!* And now, when we were all tuned up to see a kind of stunted or impoverished *Isotria verticillata,* behold! a dainty little orchid of an entirely different habit, though unmistakably a Pogonia; the flower about the size of a Snowdrop and with much the same proportion of outer to inner ring of perianth-parts, loosely compacted, but with nothing of the sprawling almost untidy look of the Large Whorled. And our first impression was amply confirmed when we began to examine the details. The relatively short sepals and pedicel spoke for themselves; they gave an entirely new aspect to the flower. But look at it where we might, it was always the differences that struck—the color of the stem, the shape and set of the leaves, the decorative design of the lip, everything.

Whorled Pogonias, both Large and Small, seem to bloom very freely in the South. Our impression—probably erroneous—had always been that the southern *Isotria verticillata,* a denizen for the most part of fairly dry woods, was less robust than our rich bogland form of the North. Be that as it may, it certainly blooms more freely than ours. And we found *Isotria affinis* the same. Nearly all the mature plants that we saw had either buds or blossoms. An interesting feature about it is the frequency with which twin flowers occur. A few seasons before, they had been observed on every third or fourth flowering plant in these colonies. We were not so favored: of nineteen mature plants, we saw twelve with a single blossom each and one with a pair. But this one served the purpose well, we cannot help thinking every time we cast a fond glance at our portrait of "the twins."

VIII

NODDING-CREST (*TRIPHORA*)

NODDING POGONIA

(*Triphora trianthophora*)

NAMES: COMMON: Nodding-crest, Nodding-cap, Three Birds. GENERIC: *Triphora* (Nuttall, 1818), "Three-bearing," of the number of flowers usually borne on a stem; SPECIFIC: *trianthophora* (Swartz, 1800), "bearing three blossoms."

PLANT: STEM: 3–8 in. high, leafy; produced from white fusiform tubers and curly wax-like underground stem. LEAVES: wide oval, about ½ in. long; alternate, clasping, concave.

FLOWERS: Pale pink to white, marked with purple and green, 2–4 in number; ½–¾ in. long, on slender pedicels in leaf-axils, erect first, then drooping. SEPALS: lanceolate, spreading, ¾ in. long. PETALS: lance-linear, ⅔ in. long, hooded together over the column, tips divergent, upcurved. LIP: white to pale pink, floored with three narrow interrupted ridges of grass-green and tipped with purple; ovate, 3-lobed, ⅝–¾ in. long; lateral lobes erected into walls, obliquely pointed at outer end; median strip prolonged into a rounded crisped apical lobe.

PLACE AND TIME: DISTRIBUTION: New England to Wisconsin, and south to Florida and Alabama. HABITAT: rich damp deciduous woods. SOIL PREFERENCE: neutral. SEASON: August–September.

SPECIAL FEATURE: Flowers several singly in successive leaf-axils.

THE "Nodding Pogonia" ought rather to be called the "Nodding Arethusa"; its popular name of "Three Birds" is in fanciful allusion to its curious flowering habit. As joint by joint the frail little stem unbends, the bud at each leaf-axil in succession opens into flower. The blossoms are very short-lived, and though four or five often appear on a stem during the fortnight's flowering season, *three* is the usual number in sight at

a time—one perfect bloom with a fading flower below and an opening bud above.

The stem rises from one or two inches to an extreme height of about eight. The little scoops of leaves, round-oval, and pointed, are arranged alternately. The flower, nodding in bud and fruit, stands alertly erect during inflorescence. Its general color is pale pink to snow-white, rimmed and tipped with purplish. With its spreading falcate sepals and over-arching petals, it has very much the appearance of a small delicately made Arethusa. But the lip is true Pogonia and very near to the Whorled; divided near the apex into three lobes by a pair of V-shaped clefts at the side; the basal lobes upraised into lateral walls, and the wide-rounded apical lobe scalloped and crisped on the margin; the central floor crested with three long narrow ridges of green.

Often as we northerners had heard of the Nodding Pogonia we never thought to see it in its native haunts, for the only known station—at Komoka in S. W. Ontario—has long been extinct. But our orchid-partnership soon changed all that; it proved a regular game of Tom Tiddler and every season found us bolder and more frequent in raiding one another's territory. In August 1926, an S O S call brought two of us post-haste to see the Bog Malaxis north of Lake Superior and then sent the other pair motoring down to New England for the "Three Birds."

Ontario and Rhode Island were to meet together, and the trysting place was Holderness, N. H., on the southern fringe of the White Mountains. With so many summers spent under canvas in Algonquin Park it sounded quite like old times to be visiting "Camp Algonquin" by Squam Lake. Like the mountain slopes behind them, its shores were entirely wooded with mixed growth, the trees tall and rangy, making light groves with plenty of elbow room and good clean floors overlaid with a carpet of leaves. Just such woods as the smaller Grape Ferns love; and

indeed we found all three of frequent occurrence, the Little, the Matricary, and the Lance-leaved.

Beech groves, our guide informed us, were the orchid's special haunt; and certain it is that in three of the four tracts of beech we explored, the Nodding Pogonia proved to be present; while prolonged search where maple, birch and oak prevailed, or under evergreens, yielded not a plant. Most of the colonies occupied depressions of the gently sloping wood-floor within a few rods of the water's edge—ample saucers and basins filled almost to the brim with a solid mat of beech leaves.

Sometimes only a single budding stem was in sight, but more often a compact little colony; and when we turned over the loose leaves on the surface, many more plants were revealed and clusters of white waxy stems. The prostrate jointed stems appeared to be the centre of the plant's life, supporting the flowering stems above and, at intervals below, producing little fleshy branches, bulbous-tipped, that thrust out this way and that and gave rise to new plants.

It would seem from its manner of growth to be strongly saprophytic. Apparently wind-blown seeds lodge in the leaf mats with which the hollows are filled, get buried under a shower of fresh-fallen leaves, and in their own good time germinate between the folds. The daughter colonies thereafter maintain themselves by underground runners and tuberous off-sets. This curious habit helps to explain why the Nodding Pogonia is so erratic; its flowering goes in waves with periodic ebb and flow; some years hardly a plant in sight, again springing up by thousands everywhere in little community sheaves of blossoming stems.

The plant, we found, was small and inconspicuous, dull purplish-green in color. At first rising above the ground, it appeared as a short fleshy scape surmounted by a little cluster of mingled bud, leaf, and stem; viewed closely this resolved itself into two main branches both exserted from the axil of the clasping leaf that crowned the scape—a pedicelled nodding bud and a spread-

Plate 72

NODDING POGONIA

(*Triphora trian[illegible]*)

Plate 73

NODDING POGONIA

(*Triphora trianthophora*)

ing curled up continuation of the stem having a tiny "budlet" in each of its three or four leaf-axils.

As the lowest drooping bud developed into an erect flower, the next section of the stem rose and lengthened out, and so on to the tip. Each flower in succession came into bloom a little before the one below it faded. Sometimes there were but two flowers on a stem and these usually bloomed for a day or two together and almost side by side. Those who have watched them season after season say they have never found a stem with more than two flowers in bloom at the same time. The process was very rapid; from lowest green bud to topmost white blossom barely a fortnight, with three or four days of open bloom for the individual flower. We were able to follow the life-history through to its close by carrying a slab of New Hampshire back to Ontario.

As the plants were only in bud when we first arrived, we had a chance to do some prowling. The place where the Nodding Pogonias grew was certainly a beech grove, and yet as we stood beside them we could count nearly a dozen different kinds of tree and shrub; and though the floor of the wood was remarkably clean, we were surprised at the variety of plants, when we came to count them up, even within a few paces of the orchid. One of its biggest colonies had a royal body-guard standing at attention on either side of it—Hooker's and Spotted Coral Root. Hooker's was plentiful throughout the wood and quite often companioned in a way we had never seen in Ontario—by its big sister *Habenaria orbiculata*. Coral Roots were also abundant, both Spotted and Early. In view of the Nodding Pogonia's peculiar habit of growth, this prevalence of saprophytes was particularly interesting; we saw them at every turn; Beech Drops, of course, Pine Sap and Indian Pipe.

A "dip" we took from the road one day gave us a very fair sample of the district's orchids; from a grassy plateau we descended into a thicket of evergreen, moist and ferny, and then

picked our way cautiously back to the car up a very wet springy slope. It was only a ten-minute jaunt, but we brought back eight kinds of orchid: Tesselated Rattlesnake Plantain, Romanzoff's and Slender Ladies' Tresses, and five Habenarias—*hyperborea*, *dilatata*, *clavellata*, *psycodes*, and *lacera*. Besides all these, Squam Lake can boast no fewer than four Pogonias; for that rarest of orchids, the Small Whorled (*Isotria affinis*), has been found at two different points about its shores; we actually saw a thriving little colony of these plants on the slopes of Little Squam. But for us in mid-August the special prize was the Nodding Pogonia.

It was on a Saturday morning that we had our first sight of the tiny plants we had come nearly five hundred miles to see. To our inexperienced eyes it looked as though it would take a week at least for the flowers to open, but our guide assured us twenty-four hours of favorable weather was all they would need. On Sunday the green buds had many of them turned pinkish-white; on Monday morning several stood erect and ready to bloom; at noon two were wide open to the sun, and by three o'clock more than a dozen.

The flower when fully out looked very charming, almost snow-white, the petals occasionally rimmed with mauve or purplish pink and the lip tipped with the same. It reminded us at once of a very delicately fashioned Arethusa, and it was interesting to know that one early botanist had christened it the Leafy Arethusa. The triple ridge of green down the middle of the lip set off to perfection the beauty of the white blossom tipped with purple. Altogether, as pretty a flower, as quaint and curious a plant, with as strange a life history as you will meet anywhere in Orchid land, is *Triphora trianthophora*, the Three Birds or Nodding Pogonia.

IX

ARETHUSA (*ARETHUSA*)

ARETHUSA

(*Arethusa bulbosa*)

NAMES: Common: Arethusa, Northern Arethusa, Moss Nymph, Bog-rose Orchid, Wild Pink, Dragon's Mouth. Generic: *Arethusa* (Linnæus, after Gronovius) "Arethusa,"—the classical river-nymph. Specific: *bulbosa* (Linnæus, 1753), "bulbed," from its rooting habit.

PLANT: Scape: 5–12 in. high, from a solid bulb, with a single grass-like leaf developing after the flowering season. Leaves: solitary, linear, basal, 4–6 in. long; protruded from the upper sheathing scale; floral bracts 2, a linear one in front, a broadly triangular one behind.

FLOWERS: Rose purple with yellow and white, very showy, 1–2 in. high, erect, solitary. Sepals: magenta, lanceolate, 1–1½ in. long, upper one erect, lateral pair curving back and then ascending. Petals: similar, erect below, arched forward above. Lip: erect below, thrust forward, downbent and dilated on apical half, eroded to wavy-crisped on margin; central floor adorned with a triple brush of whitish fleshy hairs, yellow-based and often purple-tipped; central brush longest, flanked by thread-lines of dark purple; whitish ground color of lip-face relieved on margins by dark flecks crowded and converging in and down toward the throat of the flower.

PLACE AND TIME: Distribution: Newfoundland to South Carolina in east, west to Minnesota. Habitat: growing loosely in sphagnum beds of peat bogs. Soil Preference: strongly acid. Season: May and June in south, July–August in north.

SPECIAL FEATURE: Flower magenta, solitary, erect; lip below, elbowed.

Only two species of Arethusa, so far as known, exist in the world, ours of Eastern North America and a second in Japan. By its single blossom so curiously face-like, labiate and crested, it at once suggests the Common Snake Mouth or Rose Pogonia; its household name of Dragon's Mouth hits off the resemblance happily enough. It is a very hardy plant and loves the

cool peat bogs of the north, where its little bulb develops in loose beds of sphagnum.

The slender upright stem bears aloft at its summit a gracefully poised blossom, large and showy; the rose-magenta sepals and petals grouped together, erect or bent over, behind the bold protruding lip; a dragon's tongue of a lip, lolling lambent and flickering, pale pinkish white, varied with purple and gold, triple-crested down the middle, the central crest flanked by a pair of madder lines, and the margins streaked with dark flecks that converge toward the nectaried throat of the flower.

To our mind this is the most exquisitely beautiful of all single-flowered orchids; and yet its rose-purple perianth is as nearly as possible magenta! Many no doubt will think we are greatly overpraising this little nymph of the sphagnum; indeed, the four of us are by no means at one in the matter. And even those who agree that it is beyond compare may differ widely in their reason. In our own case what draws us so strongly to it is not the color or size of the flower, but rather the form—its wonderful poise and the sense it conveys of a living personality.

The books call it "ringent" or gaping—an ugly word for so charming a flower; but to us it has always been, quite startlingly, a face watching and aware. We shall never forget the moment when our eyes first fell on its blossom in the lonely depths of a sphagnum bog. The feeling was irresistible that we had surprised some strange sentient creature in its secret bower of moss; that it was alert and listening intently with pricked-up ears. We believe that many of those whose senses are similarly attuned to living forms in Nature will understand exactly what we mean.

Showy as it is, this little blossom most certainly often escapes notice, for its season is extremely short. It is a true daughter of the sphagnum beds and loves to nestle in their deep soft pile among sheltering shrubs of heath. We know of nothing more delightful for a midsummer day than to seek a cover where hummocks of moist loose bog-moss alternate with scattered shrubs of

Plate 74

ARETHUSA

(*Arethusa bulbosa*)

ARETHUSA

(*Arethusa bulbosa*)

Labrador Tea and American Laurel, and to wander by the hour through Arethusa's haunts with the sound of the Mourning Dove and the Whitethroat Sparrow in our ears.

We met it first in a stretch of open bog within sight of the "Mud Lake" mentioned in our chapter on the Rose Pogonia. When we moved away from this neighborhood, we were greatly afraid it would be a long parting, for we learned from a correspondent who had hunted orchids for years in an adjoining district that he had never met this shy little nymph. But hardly had we settled in our new home before we happened on an ideal spot where it could be seen in hundreds any season about mid-June.

Our trail on the day we found this abundant haunt was so beset with surprises that twenty-five years have failed to dull the memory of it all. We had been tempted into a heavily wooded swamp by the sight of luxuriant masses of Royal Fern just back of the corduroy road we were following. As we passed through the bordering poplars a big swallow-like bird rose suddenly from our feet and flitted in ghostly silence through the shadows to a neighboring tree. We had barely time to note the absence from its wings of the Night-hawk's telltale bar of white, when the air was flogged with the strange whip-lash cry of Whip-poor-Will, Whip-poor-Will; among dead leaves on the ground in front of us lay a pair of roundish white eggs mottled with brown.

Beyond the poplar belt we found ourselves looking out over a wide stretch of "huckleberry marsh," wet, undrained, and knee-deep in shrubbery, its surface beautifully varied with white pines. Over to our left, about a hundred yards away, these were gathered into a long straggling grove that hid the view beyond. Here lay the likeliest-looking route to explore; so off we set, wading manfully through the underbrush. Suddenly a horrid snake-like hiss sounded out from somewhere right at our ankles and halted us on the instant. Not a sign or a movement of any kind could we see, but just as we were beginning to go forward again, the hiss was repeated; and, following the sound, we caught the sudden

glimpse of a long sharp dagger pointing at us from among the huckleberries, and behind the dagger a gleaming and decidedly reptilian eye. It was a hen bittern guarding her nest of young, as we could tell from the broken egg-shells on the ground. She resolutely refused to be flushed, even when prodded with a stick; and as we had no desire to molest her, we soon moved on.

When we came to the belt of pines, we found under their canopy great quantities of rose-veined Moccasin Flowers; just beyond, the shrubberies suddenly ended, half submerged; Pitcher Plants and Bog Beans appeared at our very feet, and standing water barred all further progress. Another moment and, glancing to our right along the edge of the open bog, we suddenly met a perfect blaze of Arethusas in bloom; they were growing in a big billowy stretch of bog moss interspersed with shrubs of Labrador Tea, Andromeda, and American Laurel; hardly a sphagnum cushion or mat for a space of twenty yards but supported its group of this rarely beautiful little orchid.

Such a stroke of luck twice over seemed almost too good to be true. But there they were, in hundreds. And for many another season it was our midsummer's chief delight to slip away to this spot for a stolen visit. Arethusa never failed to meet us there and gladden our eyes with its presence; often bringing some little surprise to crown the hour. It was here we first saw it in snow-white form; twice we came on a stem that had two perfect blooms; and once, in a backward season, it came late to the tryst with an escort of Grass Pinks and Rose Pogonias to enhance its beauty.

X

GRASS PINK (*CALOPOGON*)

GRASS PINK

(*Calopogon pulchellus*)

NAMES: Common: Northern Grass Pink, Pretty Grass Pink, Rose-wing. Generic: *Calopogon* (R. Brown, 1813), "handsomely bearded"; Specific: *pulchellus* (Salisbury, 1796), "little beauty."

PLANT: Scape: produced from a small biennial corm; slender, naked, 12–18 in. high. Leaves: solitary, basal, sheathing, linear, 8–12 in. long; floral bracts very small, acute. Spike: loose, spreading, elbowed, 3–12-flowered.

FLOWERS: Purplish pink or magenta, about 1 in. long; resupinate, with lip above. Sepals: obliquely lance-ovate, concave, lateral pair wider than middle one. Petals: longer, narrower, and less concave than sepals. Lip: uppermost and resupinate, magenta bearded with purple and yellow; narrow below, dilated above, conforming to shape of opposing column; base of lip with projecting flanges on which it swings; apical half furnished with a brush, in 3 or 4 parallel lines, of fleshy knobbed hairs, white tinged with magenta and yellow-tipped.

PLACE AND TIME: Distribution: Newfoundland to Florida in east, west to Mississippi Valley, from Lake Superior to Gulf of Mexico. Habitat: Open bogs and meadows. Soil Preference: strong to moderate acidity. Season: April and May in far south, June–August ranging north.

SPECIAL FEATURE: Flowers magenta, several, lip uppermost.

The Grass Pink, to judge from its household name, is very widely known; it is certainly a great favorite among bog-trotters: Asa Gray described the flower as "beautifully bearded," and that is exactly what the book-name *Calopogon* means. There are only four species known in all the world and their home is in eastern North America. Three of these are southern, ranging from the Carolinas to the Gulf States. But the fourth, our famil-

iar "little beauty" (*pulchellus*) is as hardy as it is handsome. From Maine to Minnesota, Newfoundland to Ontario, it abounds in all its glory, the tall stems with their handsome flower-spikes being often scattered lavishly over whole acres of rich bogland or moist prairie.

The plant springs from a corm or solid bulb and consists of a tall slender scape, sheathed below by a solitary grass-like leaf and crowned above by a spray of large showy flowers, magenta-crimson or occasionally white in color. As many as 10 or 12 of these are sometimes borne on a spike, though not more than 3 or 4 bloom together. They have an unusual pose, being tilted over on to their backs as though "taking the sun," with all their perianth parts wide spread.

This is one of the few orchids whose flowers are not twisted on their stalks; consequently the lip stands at the top of the blossom and the middle sepal below. The lateral sepals are wider than the petals and falcate in shape. The column, which curves boldly out above the middle sepal, is brightly colored like the rest of the flower and dilated at the outer end. The lip rises up at the base of the column and conforms very closely with it in shape; it is narrow below and fitted with a pair of flanges by which it swings as on hinges; toward the apex it is widened.

The face of the lip is furnished with a whitish brush of fleshy knobbed hairs, tinged with magenta and yellow-tipped. To this gaily-colored brush the insect visitor eagerly flies. No sooner does it alight than the lip swings forward on its hinges and dumps the guest unceremoniously down on its back against the outer end of the column. As it escapes from the jaws of the trap, its abdominal segments are searched by the stigma for pollen and then resupplied by the anthers.

To most of us "purple" is somehow repellent, and of all purples the most utterly impossible is surely magenta. Yet the Grass Pink is one of the most perfectly beautiful flowers in all Nature. The tall grass-like stem and leaf set off the spray of blossoms to

Plate 76

GRASS PINK

(*Calopogon pulchellus*)

Plate 77

GRASS PINK

(*Calopogon pulchellus*)

perfection. And the arrangement of the showy flowers is graceful in the extreme; a perfectly poised zig-zag, in which every blossom is elbowed into a new direction with plenty of room to expand. And then, we see it a living thing in a world of green and bathed with summer sunlight. Its associations are as lovely as the setting; we never look at it, we can hardly think of it, without visions of billowy prairie grass or soft sphagnum beds, ferns and feathery sedges, Sundews and Pitcher Plants, White Fringed Orchids and Rose Pogonias, the margin of a woodland lake or the heart of some mossy green bog, with July's perfect air and the overarching vault of blue.

Our favorite station for the Grass Pink is one corner of an old peat bog called "Ramsay's Swamp." It is only of small area, quite hidden from the roadway, and little suspected as the haunt and home of some twenty kinds of orchid and rare fern. It is even avoided by the neighboring villagers, tradition averring that once some stray cattle had "up and died" after browsing on the leaves of its abundant "Poison Elder." The only native we ever knew to enter it was an old recluse occupying a dugout on its borders, who decocted *Cypripedium* roots that he gathered there as a cure for "the rheumatiz." By a strange fatality one of us is peculiarly liable to plant infection, not only the Poison Sumacs, but even our beloved Lady Slippers stinging his hands like nettles. But this rich bit of tamarac swamp, authentic haunt of Pitcher Plants and Moccasins, was not to be denied; and we had no sooner learned of its whereabouts than we made up our minds to explore it.

Following a broken-down old line fence through its bordering woods, we presently found ourselves at the entrance to a low dense cedar grove. It was quite small—perhaps fifty yards across—but we spent a full hour within its cover, intent on a fern we had never seen before. It grew in hundreds about the spreading roots of the cedar, sometimes in leaf mould, sometimes in thin moss. It was the Least Grape Fern, reputed quite rare, and usually found in open places on dry grassy slopes or about pastures. We

have since found that dark swampy cedar groves are one of its favorite haunts.

The colony had evidently never been disturbed and had spread over the whole area. Young plants barely an inch high were very abundant; so were plants three or four years old with 2–4 pairs of round-wedge lobes on the sterile frond; occasionally a big old plant with 9–11 lobes appeared, the basal pair lengthened out into branches several-lobed. Growing as they were in dense shade and rather damp soil, they had a lax habit strikingly different from the form found in dry open pastures. A most interesting feature about this little grape-fern is its close resemblance to the famous Moonwort of Europe and our Laurentian regions.

At the other side of the grove we emerged quite surprisingly on the edge of an open bog ringed tightly round with trees. So entirely cut off from the outer world was it, that a pair of large "Marsh Hawks" had taken up permanent quarters there and angrily disputed our right of entry. They made such vicious swoops as we advanced among the scattered tamaracs that one of us had his hat knocked off and we were forced to brandish sticks over our heads for protection. The reason for this unusual boldness was evident when we reached the heart of the open space; two half-grown birds barely able to fly lay couched in a trampled thicket of tall sedges. They had evidently been nursed in the lap of hawk luxury, for we counted three pair of yellow chicken legs, some rabbit skulls, and half a plucked crow in their living quarters.

Just beyond the border of heaths and huckleberries lay a rich tract of soft moist bog-land carpeted with moss and sedges; and here with Rose Pogonia, Tall Leafy White, yes! and actually Prairie Fringed Orchids, stood great quantities of Grass Pink, their sprays of richly colored blossoms flaunting it gaily in the sunshine; Pitcher Plants, Sundew, Rose Pyrola, Buckbean, and even patches of Cat Tail forming a fit setting for this royal beauty of the Peat Bog, *Calopogon pulchellus*.

XI

HELLEBORINE (*AMESIA*)

HELLEBORINE

(*Amesia latifolia*)

NAMES: COMMON: Helleborine, Oakes Ames' Orchid, Broad-leaved Helleborine, Sauce-box. GENERIC: *Amesia* (Nelson and Macbride, 1913), -in honor of Prof. Oakes Ames; SPECIFIC: *latifolia* (Hudson, 1762), "broad-leaved." All the old names—*Epipactis*, *Peramium*, *Serapias*—given to this generic group have proved technically invalid; and first *Helleborine* (Druce, 1929), then *Amesia* (Nelson and Macbride, 1913), has been proposed as a substitute. The International Congress of Botanists, meeting at Cambridge, England, in 1930, is to select a name of final authority.

PLANT: STEM: 10–24 in. high, leafy, with very symmetrical foliage, and a long naked-looking bracted spike of flowers. LEAVES: rich green, clasping, alternate, uniformly dwindling, broad-ovate to lanceolate, sharp pointed, strongly nerved; bracts exceeding flowers. SPIKE: loose to dense, one-sided, many-flowered, spreading, tapering.

FLOWERS: Greenish suffused with watery purple; about ⅓ in. long. SEPALS: green, lance-ovate, strongly keeled, spreading. PETALS: similar, but shorter and wider. LIP: greenish and mauve-purple, darker inside; like a long-spouted sauce-boat; bi-tuberculate at base above; lower half strongly saccate, apical half cordate, acute, stiff-hinged by a transverse U-shaped crease or fold.

PLACE AND TIME: DISTRIBUTION: originally discovered on outskirts of several of our larger cities (New York, Buffalo, Toronto, Montreal); more recently found at a number of widely diverse points. HABITAT: as a rule in alluvial soil or underbrush about banks of sluggish streams, especially where wooded. SOIL PREFERENCE: indifferent, both neutral and acid. SEASON: July–August.

SPECIAL FEATURE: Lip saccate at base, apical half stiff-jointed on.

THE Helleborine belongs to a small group of orchids quite widely distributed over the temperate parts of the Old World. In North America there are only two species, the Giant or Chatterbox of the Pacific slopes and the common Helleborine

of the East. Our plant is almost certainly an importation and identical with the European "Broad-leaved." In all probability it was introduced about half a century ago, perhaps by way of commerce for its supposed virtue as a medicine.

The plant is fairly stout and 1–3 feet high; leafy below and terminating in a long tapering bracted spike, one-sided and loosely many-flowered. The blossom is purplish green, the petals wider than the sepals; the lip, which is marked with dull mauve, has the form of a sauce-boat carried forward into a stiff-hinged pointed spout.

Though the floral spike is quite large, the individual blossoms are comparatively small and so dull-colored that they cannot be called striking or beautiful. Compared with the "Dragon's Mouth" or the "Grass Pink," the Helleborine is as homely as a Figwort among Foxgloves. But it has a lily-like symmetry which is very pleasing, and the ingenious mechanism of the flower for insect pollination—as described by Darwin—fairly fascinates. Its grace of proportion is seen in the stem with its alternate leaves, thin of texture, strongly clasping, gradually dwindling as they ascend, and in the long tapering spike of alternate flowers disposed in vertical ranks and forming a loosely one-sided raceme like its tiny cousin the Creeping Rattlesnake Plantain.

The favorite haunt of the plant is in moist alluvial soil near some sluggish stream, now growing quite a distance up the shaded banks and through low woods, or again sheltered in the wet flats among alders and willows or thickets of rank vegetation. It spreads with great rapidity both overland by wind-scattered seeds and down stream by the action of the water at flood time.

The evidence against its being native is surely conclusive. It was never found till 1879, in spite of the fact that the districts in which it then appeared had been thoroughly searched over by some of the leading botanists in America; moreover, the first stations were all on the outskirts of large towns—Syracuse, Buffalo, Toronto, Montreal. True, it has been found more recently at a

Plate 78

HELLEBORINE

(*Amesia latifolia*)

Plate 50

HELLEBORINE

(*Amesia latifolia*)

number of isolated points in the depth of the country. As many as six or seven stations are known to us four in quite out-of-the-way corners of New York State alone. But it must be borne in mind that orchid seeds are almost as minute as fern-spores and can be carried for miles in the wind.

It is certainly spreading very rapidly at the present time and has lately established itself at many fresh places. In New York State it has made its way from Buffalo to Rochester and several other quite distant points. In Ontario, daughter colonies of the original station in Toronto have appeared at a distance of some ten miles; and we are bold enough to trace our own personal discovery of it near Peterborough to the same parentage.

It was certainly a great surprise to find the Helleborine growing in Central Ontario at least 70 miles away from the nearest recorded station; but however much the mere botanist in us might puzzle over its presence, we were very glad to accept it as a windfall from heaven. We had been out hunting mushrooms one September along a wide glacial ridge of grasslands, partly wooded with maple and elm, thickets of hemlock and cedar, pine groves, and spreading shrubberies of juniper and yew. Spying a regular melon-bed of giant puff-balls in a dark cedar aisle and diving in to sample the crop, we found ourselves staring at a strangely familiar lily-like stem of straight-veined leaves, surmounted by a long naked-looking bracted spike. The flowers had faded, but the curiously shaped lip with its U-shaped transverse hinge was unmistakable.

Reconnoitring up and down the banks of an adjacent stream still gay in spots with Cardinal Flower, we found the Helleborine scattered over more than a mile. It rarely left the banks of the creek more than a few yards, unless there was low ground; and the colonies were all in groves of cedar and other sheltering trees. Twice the stream crossed open pastures and here not a trace of the plant was to be seen. At one spot in a pine wood, it had climbed half-way up a gentle slope almost to the edge of a big patch of finely-cut

leaves which we took to be Squirrel Corn. Early next June we traced it up another mile, and on the way discovered our "Squirrel Corn" blooming lustily in the midst of its pretty bowers of soft gray-green foliage;—it was Golden Corydalis, the first station we had ever found within reach of us on a half-day's tramp.

This orchid figured once more, and very pleasantly, in a recent visit we paid to Rochester. At the close of our stay we were given the choice of visiting the local station for Helleborine and observing its rapid spread, or of spending a day at Bergen. It was June 17th, but there was just an off-chance of seeing White Lady Slippers in bloom, so we plumped for Bergen.

We had the greatest good luck, for just before lunch we discovered a shaded retreat in which they were flowering late. Our party included an old acquaintance of Carl Akeley's, a taxidermist with a fondness for snakes, and our afternoon opened with a pleasant exchange of compliments. We found the largest grass-green snake the "herpetologist" had ever set eyes on; and presently he called us to come and look at two plants of *C. candidum* he had just discovered. One was a foot-high giant with two blooms, the other a two-inch pigmy, perfect in all its parts and proportions, leafy stem, flowering scape, and dainty little blossom, its snow-white lip purple-spotted without and violet-veined within.

Later on, the snake-fancier made off into the woods with a sack to hunt for Massasauga Rattlers, a quest in which we left him severely alone. Soon after he had gone we made a very curious discovery on some blossoms of White Lady Slipper. Crab spiders, as white as the Cypripedium cups, were unusually abundant; and while watching one of these we caught sight of a much smaller specimen close to it with long dark fore legs, which sidled over the dome of the cup and disappeared. Presently we discovered a second of these tiny creatures, like the first, close beside a big white one; and when we approached a finger to it, it beat a hasty retreat to the well-rounded back of its companion, where it stood boldly "on deck" ready to repel boarders. It was our first

introduction to that curious corner of Spiderland, in which the male is dwarfed to the scale of a parasite on the female.

When we reached our rendezvous later on in the afternoon we found the snake-fancier there before us. He, too, had made an excellent bag; besides Pigmy Rattlers, he had captured some Garter Snakes, two pair of Grass Snakes, one with the blue—almost turquoise—spots that are said to mark the mating season, a DeKay's Brown Snake and a Ringneck. Also, he had something to show us, he added: an orchid, he was pretty sure, but of a kind he had never seen before. And taking us over to a fence at the foot of the lane he pointed to two fine sturdy stems of Broad-leaved Helleborine. That was in 1926, and we have been on the watch ever since to see how it spreads.

XII

LADIES' TRESSES (*SPIRANTHES*)

I. LITTLE LADIES' TRESSES

(*Spiranthes Beckii*)

NAMES: COMMON: Little Pearl-twist, Beck's Tresses, Little Ladies' Tresses. GENERIC: *Spiranthes* (L. C. Richard), "spiralled blossom;" SPECIFIC: *Beckii* (Lindley, 1840), "Beck's."

PLANT: ROOT: one single tuberous spindle. STEM: 5–9 in. high, very slender, scape-like, the leaves in a basal cluster. LEAVES: ovate-oblong, early withering; floral bracts, small, acute, deciduous. SPIKE: one-ranked, 1–3 in. long, in 2–3 spiral rounds, occasionally one-sided or secund.

FLOWERS: Entirely white, narrow-tubular, ⅛–½ in. long. SEPALS: upper one connivent with petals roofed over the column and lip; lateral pair hardly spreading. PETALS: similar, forming a hood with the upper sepal. LIP: entirely white, eroded-crisped and deflected toward apex, nipples at base slender.

PLACE AND TIME: DISTRIBUTION: Southern New England to Florida and Texas, and up the Mississippi Valley to Arkansas, Tennessee and Kentucky. HABITAT: dry sandy soil often about thickety banks and on margins of oak woods. SOIL PREFERENCE: strongly acid-loving. SEASON: March–August in south, August–September in north.

SPECIAL FEATURE: Root a single spindle, leaves ovate, lip entirely white.

THIS dainty little orchid is our prime favorite in a charming group. Few things in the world of flowers can match the beauty of the spiral "tresses," and for delicate grace the gem of them all is Beck's. It is quite the smallest, and even slenderer than the Slender. So fairy-slim is the stem, you marvel that it stands upright; but it does, even rising to a height sometimes of 12 inches and supporting its spike of flowers with perfect ease on the thread-like shaft.

It usually stands 5–9 inches high. At the base is a little cluster

of oval leaves which die away in flowering time. The floral spike is about an inch long, a gently spiralled flight in single file of tiny tubular blossoms. They are entirely white, even to the lip, which is oblong, of delicate texture, and crisped or wavy at the tip.

But for this prominent "label" of a pure white lip without any central stripe of green, the Little is so exact a copy in miniature of the Slender, that we should have to uproot it to make sure of identification; and who would wish to dig up so rare a flower at its season of blooming? Besides, it is doubtful if the root alone would settle the question. The Slender, too, starts out in life with a solitary spindle; and not long ago among some plants of Beck's sent to us for examination, we found one whose tap-root divided below into four separate prongs!

Though closely akin to the Slender, it chooses a somewhat different habitat. Both make their home about fairly dry grasslands, but Beck's has a peculiar fondness for the borders of oak woods, especially where a sand-and-clay soil is lightly overlaid with mossy turf.

Only a year ago while down in Maryland in late September, to our great delight we came upon this charming little flower again and again. And one day, having crossed the Potomac into Virginia, we happened on a little group we shall long remember: three flowering stems, the middle one quite unique, its blossoms all wide-spread with their tiny tubes flung open. They had a most novel and pleasing effect, as of mutual foils enhancing each other's beauty.

But nothing can quite recapture the thrill of our first discovery. It was at the very end of a trip in New Jersey. Day after day, we had hunted high and low for a sight of this orchid, combing over all sorts of promising ground and always returning to headquarters empty-handed. It seemed at the time the very worst of ill-luck; but looking back on it all, we'd be sorry to have missed even one of those apparently profitless trails. They made us thoroughly familiar with the various types of grassy cover which the Little,

Plate 80

LITTLE LADIES' TRESSES

(*Spiranthes Beckii*)

the Slender, and the Spring Ladies' Tresses most frequent; and, besides, they brought us into close touch with some of New Jersey's most characteristic *fauna*, notably that famous viceroy of Birdland, the American Osprey.

This creature is very abundant there; and ocean spoil being its sole food, no one molests it. The farmers even encourage it to build in their orchard trees; and as its habit is to return season after season to the same site and fling a few more sticks on the old by way of repairs, these great faggot-bundles of nests form conspicuous landmarks. Even the "one-hoss shay," when it falls to pieces, is translated to a new use and a higher sphere; mounted on long poles in garden or yard, its wheels are soon turned into Osprey's eyries.

One late afternoon as we were returning dejectedly to headquarters, actually for the last time, we passed a little country schoolhouse whose barefoot pupils had apparently neglected to pay their toll of buggy-wheels, for an osprey had dumped its barrowful of sticks on the belfry and brooded unmolested, as welcome as the family stork.

Perhaps there's some mystic bond between orchids and ospreys. Anyway, we had hardly left this roof-peak nest behind us, when the sandy side-road we were scouting along cut through a stretch of woods and suddenly, in a little bit of border glade, we caught a passing glimpse of what looked like Slender Ladies' Tresses; just such a group as, twenty times at least before, had sent our hopes soaring only to shatter them. But this time, at last, it proved to be Beck's! The flowers were pure white, lip and all; and when, to make assurance doubly sure, we carefully pried up one of the plants from its sandy bed, the tell-tale single fleshy taproot, brown and hairy, dangled before our eyes.

At the very first glance, we were sure of one thing at least—that here was the gem of all the Ladies' Tresses we had ever seen. They were about half a foot high, slender as threads, with inch-long spirals of the tiniest ivory tubes of flowers imaginable.

We had hardly done admiring this first group, before we discovered another, and then another; they were growing in sandy soil, on an unkempt bank of grass and underbrush. By this time it was nearly dusk, and we hurried off to the car.

At headquarters we discovered to our dismay that the plant-press had been left behind. All our treasured new finds of the trip lay stored between its covers. And then, to make matters worse, it settled down for a wet night. Next morning when we hurried back to the spot, the press was gone, and it took us two hours of house-to-house search to find it. By a curious chance, it was quite undamaged. It had lain flat on the ground; and some stout overlapping sheets of cardboard, stowed away on the top, had served to shed the rain clear of the dryers.

All's well that ends well. The morning was just right for taking pictures, and we hurried eagerly back for our farewell tryst. The impressions of the evening before were amply confirmed; *Spiranthes Beckii* was indeed a gem, and as we turned away at the end of our work, we felt a thrill of genuine pride in being on intimate terms at last with this little aristocrat of the Ladies' Tresses.

II. SLENDER LADIES' TRESSES

(*Spiranthes gracilis*)

NAMES: COMMON: Slender Tresses, Green Pearl-twist, Long Tresses. SPECIFIC: *gracilis* (Bigelow, 1824), "slender."

PLANT: ROOT: a cluster of spindles. STEM: 8–30 in. high, slender. LEAVES: ovate, in a basal cluster, withering at or before flowering season. SPIKE: very long proportionately, single-ranked, usually in several "flights" of secund blossoms.

FLOWERS: White with a green stripe, ⅕ in. long, narrow-tubular. SEPALS: narrow oval, pointed; lateral pair scarcely spreading. PETALS: similar, arched with the upper sepal into a helmet with upturned peak over the column and lip. LIP: slightly grooved, with a broad stripe of green down the middle, margins white and wavy-crisped, apex deflected.

LADIES' TRESSES (*SPIRANTHES*)

PLACE AND TIME: DISTRIBUTION: Atlantic Provinces and New England in east to Florida, west to Manitoba and down the western slope of the Mississippi Valley to Louisiana and Texas. HABITAT: Dry rocky open woods, sandy plains and shore lands. SOIL PREFERENCE: moderately acid, but quite tolerant. SEASON: July-September according to climate.

SPECIAL FEATURE: Leaves ovate in a basal rosette, lip floored with green.

THE Slender Ladies' Tresses is so common a sight for most of us that we have to think ourselves back into a far-off past to realize the intense delight with which we first looked on its delicate grass-like stem and quaintly twisted spike of white flowers.

The plant springs from a bunch of spindle-shaped roots. At its base is a little cluster of oval pointed leaves, shaped like those of the Rattlesnake Plantain, but very short-lived, perishing as a rule before the flowering season. The stem is graceful and slender, ranging from less than a foot to two feet in height. The one-ranked floral spike usually includes two or three long flights of obliquely ascendant blossoms separated by short, sharp spirals. The flowers are narrowly tubular and white, except for a stripe of green down the middle of the lip, which is flared and crisped at the apex. They are quite fragrant and attractive to insects.

A noteworthy feature is the length of the flower spike. In proportion to size no other kind displays so long drawn out a spiral of blossoms. The stem is so grass-like and slim that even when the buds have opened into little coralline tubes of white, the plant is hard to detect. It is an abundant orchid wherever conditions favor its growth and quite a familiar sight to all four of us on our August trails,—in the region of the Great Lakes, about the mountains and coasts of New England, and at many points in New Jersey and Maryland. Its favorite haunts are sandy grasslands especially on hillsides and lake margins, or in open dry boulder-strewn woods of oak and pine.

After coming to live in Central Ontario, we lost sight of this pretty little orchid for several seasons; and then at last there

came a happy day of reunion. Next to the joy of first discovery is the glad surprise of meeting an old acquaintance. We happened at the end of July to be taking a go-as-you-please tramp some miles south of the little woodland lake of Pink Moccasin fame. It is open rolling country pleasantly varied with woods of oak and pine; a land of streams and winding valleys, flanked now by steep walls of pasture, now by leisurely sloping plains. About the lower levels in September Nodding Ladies' Tresses love to bloom.

The valley we were wandering through was partly smothered in drifting sand; but Nature had trimmed her balance to perfection, and the fields were gay with the loveliest flowers. Masses of Orange Milkweed alternating with thickets of Sweet Fern did their best to turn the desert into a garden; Wild Bergamot was very abundant with its fragrant foliage and beautiful heads of lavender; along with the small-flowered Blue Vervain we found the big handsome spikes of a lilac species, with very large blossoms and woolly leaves; in the swampy margins of the central stream were scattered spikes of Hooded Tresses along with Kalm's Lobelia; just above them, at the spring of a steep slope, slender-stemmed Bluebells and Spiked Lobelias reigned supreme.

But it was when we climbed to the top that the big surprise was met. In the oak wood that overlooked the valley, and actually straying into the sandy plain beyond, we found our long-lost Slender Ladies' Tresses, looking prettier and more graceful than ever, at one point sharing their home with Green Adder's Mouth. As if to mark the spot forever in our minds as the home of Ladies' Tresses, we had barely descended the slope into the next valley, when we stumbled on a colony of Shining Ladies' Tresses. So here, united in space, if separated by time, were all four of our northern *Spiranthes*.

A later and a luckier find still brought this old favorite within an hour's easy motor run of home, and just in the nick of time for the camera man. Seizing the chance of camping quarters at

Plate 51

SLENDER LADIES' TRESSES

(Spiranthes lacera)

Plate 82

SLENDER LADIES' TRESSES

(*Spiranthes gracilis*)

Crowe's Landing, we set out one day to explore the margins of a near-by woodland lake. The trip was a regular "teeter-log" of ups and downs; but the blank of a long hard morning was more than off-set at the tail-end of the day by a most lucky strike of Loddiges' Rattlesnake Plantain. What so perfectly trimmed the balance in our changing fortunes was the noon-hour rest near the head of the lake.

We know of few more delightful spots in all the Kawartha district. For half a mile here the terraced limestone is replaced by solid granite; through the midst of this the Indian River has carved a passage for itself out of Stoney Lake, and, dashing headlong through a rocky gorge of cataract and rapid, settles down to peaceful slumber in the cradle of a lake. The whole area is rich with forest verdure: magnificent groves of oak and pine and other trees welcome the wayfarer to their cool retreat; and his eye is gladdened as he rests by the sight of many a companion form, lovers like himself of the gray granite and the woodland screen—mosses and ferns, stone-crop and saxifrage, hare-bells, columbine and corydalis.

After four hours' grilling up and down the east shore of the lake, it was an unspeakable luxury to stop at this half-way house for a spell before tackling the western margin. Crossing the stream near the head of the falls we made our way down a woodland path among boulders and polypody to the foot of the rapids. Here we soon found a spot to our liking, and sprawled out in the shade of a gnarled old oak to enjoy our snack of lunch and a well-earned rest. In less than five minutes we were on our feet and full of excitement! Slender Ladies' Tresses were growing in the grass all about us! The effect was magical; weariness fled from our limbs and we were thoroughly heartened for the rest of the day.

A happier find than this we could hardly have made. Not for some years had we seen it on our northern trails; never so near home or in such beautiful surroundings. The colonies were quite

numerous, scattered about the margins of a big stretch of rock flats, as a rule in grassy alley-ways with a background of low shrubs. The best of all was right where we lunched: behind them a fringe of spreading juniper, on the granite floor in front a big mat of *Selaginella rupestris*, beside them two or three plants of *Botrychium simplex*, there they stood in the dry turf, a group of lithe and graceful stems just opening into snowy bloom.

III. SPRING LADIES' TRESSES

(*Spiranthes vernalis*)

NAMES: COMMON: Spring Ladies' Tresses, Spring Tresses, Narrow-leaved Tresses. SPECIFIC: *vernalis* (Engelmann and Gray, 1845), "spring."

PLANT: STEM: 6–22 in. long. LEAVES: in a basal cluster, lance-linear, grass-like, 2–6 in. long; floral bracts, longer than ovaries, with hyaline margins. SPIKE: 2–5 in. long, one-ranked, in regular spirals or long secund flights.

FLOWERS: Entirely white, tubular, ¼–⅓ in. long. SEPALS: upper one connivent with petals; lateral pair slightly spreading and descendant, supporting lip at base. PETALS: arched with upper sepal over the column, tips forming an upturned peak. LIP: somewhat grooved down middle, sides upcurved and revolute, strongly deflected toward apex.

PLACE AND TIME: DISTRIBUTION: chiefly coastal, Massachusetts–Florida, Gulf shore to Texas and New Mexico, up Mississippi Valley to Kansas, Missouri and Illinois. HABITAT: rather dry grasslands, both pasture and meadow. SOIL PREFERENCE: sub-acid where tested in Maryland and Virginia. SEASON: January–June in extreme south, July–early August in New Jersey and Maryland, August–September in New England.

SPECIAL FEATURE: Leaves long, lance-linear, grass-like.

"SPRING TRESSES" is a cap that fits this orchid admirably in the extreme south, where it blooms from January to May. Farther north, "Summer Tresses" would be a better name. In Maryland and New Jersey it flowers in July; in New England, if at all, from August to September.

Like all the single-ranked Ladies' Tresses it has a remarkably elegant form—tall and tapering; in general, hardly to be dis-

Plate 83

SPRING LADIES' TRESSES

(*Spiranthes vernalis*)

Plate 84

SPRING LADIES' TRESSES

(*Spiranthes vernalis*)

tinguished from *Spiranthes gracilis*, except by its leaves; these are long, slender, and more or less erect, like grass-blades. The plant is on the average well over a foot in height, ranging from 6 to 22 inches. The stem is perhaps a little stouter than that of the Slender, and the spike somewhat shorter in proportion; but the habit of the two is almost identical, and the flowers have the same fondness for mounting in oblique tiers, like successive flights of stairs, each "ladder" of closely secund blossoms separated from the next by an abrupt half turn of the rhachis. The petals and sepals are white, and the lip is without the broad stripe of green so conspicuous in the Slender; its median line, instead, is flanked with cushions of a yellowish tinge that give a characteristc creamy look to the whole spike of flowers.

In its leaves as well as in its yellowish lip-floor, the Spring Ladies' Tresses approaches very closely to the Giant. Indeed botanists have actually confused the two plants and applied the name *præcox* to *Spiranthes vernalis*. The problem has been further complicated by a form of Ladies' Tresses found in some abundance on the New England coast. This is now strongly suspected of being a hybrid between *Spiranthes gracilis* and *Sp. cernua*.

Whatever may prove to be the true status of the New England plant, conditions go to show that farther south *Spiranthes vernalis* is no hybrid but a genuine species. In New Jersey and Maryland it blooms in the month of July, at least a fortnight ahead of the Slender Ladies' Tresses and five weeks before the Nodding. It seems unlikely that so early-flowering an orchid should be the offspring of two late-summer parents. Its distinctness from the Giant Ladies' Tresses is even more marked. In the fourth week of August, about Cape May, when *Spiranthes præcox* was just beginning to bud out with its roots submerged in the ooze of the very wettest of bogs, *Spiranthes vernalis* showed ripe seed-stalks about the dry grass-lands of the coast.

Our first meeting with this orchid was in the midst of a scene

that we shall long remember. We were having our first dip, botanically speaking, in a New Jersey salt marsh. And such a wealth of new and curious plants we had never even dreamed of before: Indigo Broom, Rattlebox, Bayberry, Spotted Bergamot, Meadow Beauty, Partridge Pea—a lovely purple-eyed golden senna with mimosa-like leaves; Hibiscus in thickets like monster shrubs of dog rose, with big blossoms as of garden Hollyhock, now pink, now white, now crimson-hearted; and loveliest of all, the Sea Pink or Starry Sabatia, a delicate shell-pink blossom, eyed at the centre with a star-pointed ring of yellow-green edged with brown or red; to our mind one of the most exquisitely beautiful flowers we have ever seen, and sown broadcast by Nature with lavish hand throughout the salt marshes.

We had just turned our backs on all these wonderful sights and were heading for home along a grassy causeway, when we stumbled on *Spiranthes vernalis*, a single small stem, belated and astray, but unmistakable from its combination of single-ranked flowering spike with long narrow leaves. On inquiry, we found that the normal plant, abundant in some of the mowing fields, had had its flowering time a month before. Herbarium specimens proved a poor substitute for the living plant; and a packet, sent us two seasons later of New England "*Spiranthes vernalis*" fresh-gathered in Rhode Island, was even more disappointing. They seemed a very different thing, much heavier-spiked, the flowers stouter and more crowded.

It was not till a year ago, in Maryland, that the final round-up came; and, along with it, came something very much rarer to fix the date in our mind. Ferns are not orchids, but they have always been great favorites with us; and when we learned that three of the very rarest grew within easy reach of where we were, we jumped at the chance. Our orchid-goal was reached; we had a whole day to spare; how better could we spend it than with such old friends as the Spleenworts?

What a relief it was after grilling in the hot sun to steal away

into the wooded valleys of Pennsylvania! And what glories of fresh green fronds the dripping rocks displayed! At noon we lunched below a great ferny-green cliff, a river in front of us and a beautiful cushion of Walking Leaf at our elbow. In an hour or less we had entered "Asplenium Paradise"—a rugged gorge on whose steep rocky slopes we saw scores of Pinnatifid and Mountain Spleenworts, big luxuriant plants in a lovely setting; and at one spot, what appeared to be a hybrid between them (*Asplenium Trudellii*), a curious blend of both its parents. Last, we were whisked away to the heart of a deep wooded valley and along a stony footpath that was also the bed of a stream, till we reached the base of a great rock wall. Here we halted and found ourselves face to face, for the first time in our lives, with a colony of Bradley's Spleenwort, one of the rarest and most beautiful of all our ferns.

The whole of the following day we spent in the field with *Spiranthes vernalis*. We were surprised to find how abundant it was. Besides several fine colonies actually in bloom, we came upon traces of it at almost a score of different points. It has a curious fondness, we were told, for newly filled-in areas, springing up there as a rule in the third season. We found it could be looked for with confidence in open dry fields that had escaped mowing. Not infrequently *Spiranthes gracilis* makes its appearance in the same cover, but some two weeks later. *Spiranthes cernua*, the latest of all, seeks a moister home.

One scene, in which this orchid had its setting, we recall with peculiar pleasure. It was a big open field in the district of Chevy Chase, undrained but fairly dry, and falling away at one side to a bordering brook. Some distance upstream from our corner of entrance we discovered a colony of Yellow Fringed Orchids out in bloom; they must have been a week in advance of any we had seen that day. It was a delightful surprise to come upon them so unexpectedly in all their glory, transforming the moist trough where they grew. The soft brilliance of those rich orange

plumes soaked through and through with sunlight was quite beyond description. As we made our way up a gentle slope toward the central plateau we noticed some plants of Ragged Orchid, one of them a giant. Pink Polygala and Purple Gerardia were also present and the little Antennaria known as "Pussytoes."

And then, in the very middle of the field, crowning the slope, we came upon a large colony of Spring Ladies' Tresses. Tall slender stems with tapering spikes of gracefully spiralled white flowers, they looked so like *Spiranthes gracilis*; and yet so different, with the long narrow grass-blades of foliage set about their base, and the tubular flowers as white almost as those of *Spiranthes Beckii*, not floored with a central stripe of green. They seemed somehow in perfect harmony with their setting. The very spirit of the grass-lands was in those slender swaying stems; and it was good to learn that they had been there many years, springing up season after season to queen it over the pastoral scene.

IV. GIANT LADIES' TRESSES

(*Spiranthes præcox*)

NAMES: Common: Giant Ladies' Tresses, Giant Tresses, Grass-leaved Tresses, Water Tresses Specific: *præcox* (Walter, 1788), "early maturing"; named for the Carolina plant which blossoms May–June.

PLANT: Stem: 16–32 in high, slender, smooth below, pubescent above. Leaves: linear, 4–10 in. long, mostly basal, one much the longest; reduced to bracts on the stem. Spike: 3–6 in. long, a one-ranked spiral, close-crowded in bud.

FLOWERS: Snow-white, ¼–⅖ in. long, tubular below, two-lipped and ringent at apex. Sepals: upper sepal connivent with petals; lateral pair twirled into awl-shape, pointing forward and down outside and below the lip. Petals: overarched with upper sepal into a slightly vaulted hood with upturned peak. Lip: slightly flared toward apex, crenulate or wavy-crisped, somewhat downcurved.

PLACE AND TIME: Distribution: New Jersey to Florida and about the Gulf shore to Alabama and Texas. Habitat: wet grassy bogs. Soil Preference:

not tested, but from its New Jersey stations and plant companions probably acid. SEASON: March–June in south, August–September in New Jersey.

SPECIAL FEATURE: Tall plant with crowded one-ranked spike of flowers, appearing in wet grassy bogs.

THE Giant or Grass-leaved is the only one of the single-ranked Ladies' Tresses that grows in a thoroughly wet marshy situation. It is really a sub-tropical plant ranging from the Gulf States to South Carolina; but like the Yellow Fringeless Orchid (*Habenaria integra*) it has found a footing for itself in the genial climate of New Jersey. It is a summer-flowering species; in the far south where the spring of the year follows hard on the winter solstice it blooms between March and June; about Cape May, from August to September.

The plant stands from one to nearly three feet high and has a very erect, slender stem, leafy below, bracted above. The leaves are long and narrow, the lowest measuring almost a foot. The floral spike ranges from 3 or 4 to 8 in. in length; quite slim in its earlier stages, being crowded with closely appressed erect buds tightly coiled in a single rank. As these mature they assume a horizontal position, long narrow tubular faces looking out sideways in a strongly spiralled tier.

The flowers are white and distinctly ringent: the middle sepal and petals above, forming a convexed helmet with upturned peak; the lip below, flared and wavy-crisped near the apex. The lateral sepals are entirely free, twirled into awl shape, somewhat spreading, and depressed below the lip.

This giant among the single-ranked Ladies' Tresses has been confused with *Spiranthes vernalis*, and in some Floras the description of one plant appears under the other's title. Actually, New Jersey plants of *Spiranthes præcox* have more than once been pronounced typical *Spiranthes vernalis*. But they are certainly two quite distinct species, widely different in appearance, season, and station. Nowhere could you find more convincing

Plate 85

GIANT LADIES' TRESSES

(*Spiranthes præcox*)

proof of this than in the Cape May district. Both plants are locally abundant; and in August 1924, when we visited this neighborhood, we found ourselves too late for the Spring Ladies' Tresses, which had flowered profusely a month or more earlier, about the dry grass-lands and mowing fields, whereas the Giant Ladies' Tresses, at the end of our visit, were just beginning to push their tall budding stems into prominence in some of the wet open bogs.

This is its favorite haunt—thoroughly saturated, even submerged, sedgy bog floors; companioned by Snowy Orchids and Rose Pogonias. We do not know of any other cover that harbors it. And it is surely significant that this giant of the single-ranked group should, like the immense Fragrant Ladies' Tresses, require the rich ooze of wet boglands to support it.

Rightly or wrongly, it is associated for all time in our minds with one of the strangest things in all New Jersey's long list of wonders. On the eve of our first descent on the orchid-bogs of Cape May, the whole countryside from dusk to dawn resounded with multitudinous booming voices. It seemed as though the whole race of subterranean gnomes that guard the treasures of earth were rallying to the rescue of their beloved bog *flora*. There had been a tropical cloudburst the day before, with a rainfall of over nine inches, and the Spadefoot Toads were out for their annual Eisteddfod.

These strange creatures live entirely underground, appearing only once a year—as a rule in the Spring, but always during heavy rain—when they gather in great numbers to spawn in the marsh pools. They remain above ground only a day or two, and disappear as suddenly as they came. They are nocturnal in habit and, when disturbed, dig themselves into the ground with the speed of an armadillo, actually sinking out of sight before one's eyes. Hermits as they are well called, they remain buried in their subterranean cells for weeks and months, even—it is thought—for years. They have been found more than three

feet down with no trace of an open burrow leading to the surface.

The females make a low grunting sound; but the call of the males is so much louder than that of the common toad as to deserve the name of a bellow. The sound carries to a great distance and, heard in the dead of the night and a strange land, is weird in the extreme. But it didn't daunt us an atom; we "went over the top" next morning without turning a hair. And on reaching our objective, one of the famous "Bennet Bogs," almost our first capture—along with the Snowy, the Crested, and the Yellow Fringed—in a setting of sedges and Bog Asphodel, was *Spiranthes præcox*.

For so tall a plant we found it astonishingly difficult to detect in the bud stage. The slender green floral spike was simply lost in the multitudinous jungle of reed grasses and sedges. Fortunately for us, the season was unusually early; and before we left, its giant stems had come to full height and were waving their snowy spirals conspicuously in the local "everglades" where they make their home. We spent a delightful half day wading and wandering among them, while high in the blue vault overhead soared and circled and sailed a pair of great wide-winged Turkey Buzzards.

V. SHINING LADIES' TRESSES

(*Spiranthes lucida*)

NAMES: COMMON: Shining Ladies' Tresses, Shining Tresses, Wide-leaved Tresses, Golden Pearl-twist. SPECIFIC: *lucida* (H. H. Eaton, 1832), "shining," in reference to the glossy leaves.

PLANT: STEM: 4–9 in. high, smooth and fleshy. LEAVES: clustered at the base, lance-oblong, 1–5 in. long, smooth, fleshy and shining. SPIKE: 1–3 in. long, in several ranks (3–4), crowded and spirally twisted.

FLOWERS: White, tubular, floored with saffron, slightly flared, 1/5–1/4 in. long. SEPALS: narrow lanceolate; lateral pair free, forward-pointing, barely spreading. PETALS: similar, forming with the upper sepal a hood over the column and opposing the lip. LIP: white with a broad central stripe of yellow edged with green; oblong, concaved, deflected at apex, flared and crisped.

PLACE AND TIME: DISTRIBUTION: Quebec and New England in the east to New Jersey and Virginia, west to the Great Lakes from Ontario down through

Michigan, Wisconsin and Ohio. HABITAT: moist grassy river-banks and lake-shores, occasionally damp meadows. SOIL PREFERENCE: neutral or very slightly acid; rare in Ontario and practically always in limestone regions. SEASON: June–early July.

SPECIAL FEATURE: Lip floored with rich yellow.

THE Wide-leaved or "Shining" (*lucida*) is one of the prettiest of all our Ladies' Tresses; it more than atones for its small size by the attractiveness of its plump sleek leaves and the touch of rich saffron on its lip—a beauty spot every bit as charming as the gold in a Freesia's throat. It is of wide but by no means uniform distribution, from the Maritime Provinces and New England south to Virginia, and west to Ontario and Wisconsin. It flowers between early June and late July according to season and climate.

The plant consists of a little cluster of stout roots, 3 or 4 lance-oblong leaves, fleshy and glistening, and a flower stem 4–10 in. high. The blossoms are somewhat crowded in a spike of several not very regular spiral ranks. More or less erect in the bud, they become horizontal as they open, and appear in profile as though looking out sideways. They are narrow-tubular in form and white; the apex of the lip has wavy-crisped margins and a decorative spot of orange tinged with green.

It is quite a prolific plant and often grows in great close-packed colonies. Hosts of it flourish about limestone cracks on the Canadian shore of Lake Erie close to the head of Niagara River. It appears occasionally in springy pastures at a distance from any flowing water; but its favorite habitat is along the moist banks of running streams. A frequent companion is the Adder's Tongue Fern.

One of "us northerners" well remembers his first discovery of this plant in a region where it is far from common; so uncommon, indeed, as to be omitted, at the time we speak of, from the check-list of wild flowers native to the Province.

It was in the middle of a most exciting day's fishing that the find was made; which all goes to show what a companionable creature our hobby is. Four ardent anglers at loggerheads about black bass had repaired to a near-by lake to test out their rival theories. Two of us were to be rowed up and down our favorite shoal by a Rideau pilot who knew the ground. Our rivals, swearing by the weed beds, had chartered the services of an old trapper at the foot of the lake. Two points were at stake, the number of bass per boat and the biggest single fish.

All forenoon the lake lay in regular "doldrums," not a breath of wind, not a cloud in the sky, not a single fish on the move. When we met our rivals at noon by Grassy Creek, there was talk of calling the contest off. But soon after lunch a breeze sprang up and a rush was made to the boats. It was at this supreme moment that the botanist was found wanting, and being hailed by the frantic anglers was distinctly observed to stoop for "some darned weed" in the grass and carefully transfer it to the inside of his tackle box.

The boats were no sooner launched than they drew apart as by magic, each for its haunt of the morning. On our rock shoal the bass were biting eagerly and gave us a most lively afternoon of sport; most of the fish came to the wrong side of the boat for the botanist, but he managed to hook and land the largest black bass his steel rod ever played. Alas! when we came to compare notes at the end of the day, our rivals had one more fish than we had, and their catch included a regular "socdologer," the mate or very near it of our biggest.

On an appeal being made to the standard scales, imagine our consternation when they declared our rivals' fish full three ounces the heavier. We could hardly believe our eyes. Their fish seemed actually less chunky than ours, no longer from nose to tail, no deeper between dorsal fin and belly. Our pilot, with looks that swore if the scales didn't lie the fish did, hauled out some twine and began to take the girth of this remarkable bass, when

Plate 80

SHINING LADIES' TRESSES

(*Spiranthes lucida*)

Plate 87

SHINING LADIES' TRESSES

(Spiranthes lucida)

suddenly with a gasp he dropped the string, opened the fish's mouth, and thrusting thumb and finger down its gullet, drew out a three-inch chunk of lead piping. No wonder the trapper had declined our invitation to supper!

And here for the anglers the incident closed, but not for the botanist. Bright and early the very next day, while the rest of the crowd were still dreaming of bass, he was off hot foot to Grassy Creek; for the "darned weed" he had brought home in his tackle box turned out to be a species of Ladies' Tresses entirely new to him, and apparently to Ontario. It was only after prolonged search through the Provincial botany that he finally discovered it, not very happily relegated to an appendix of plants "found chiefly in the Maritime Provinces."

It proved to be fairly abundant, in "soggy" turf along the margins of the creek; at one spot, where the grass bank had given way, a number of plants were found marooned in midstream along with a bed of blue flags. There could be no doubt of the orchid's identity; the spot of rich yellow on the lip was unmistakable, and so were the characteristically wide leaves, shining and fleshy.

This was in Eastern Ontario. Only two years later, while judging some pupils' collections of wild flowers in the central part of the Province, he discovered the presence of a colony just north of Lake Ontario. It is, however, very far from common in the district; and for several years we hunted vainly in the neighborhood of Peterborough for traces of it, and actually despaired of ever having it within calling distance again.

Then some three years ago, while exploring the margin of the "Big Murray Swamp," we happened on a few spikes of this old favorite at the edge of a bit of moist pasture. Where could they have come from? For two hours we hunted diligently in almost every direction through the fields that bordered the swamp. At last completely baffled, we turned north up through a rough sunbaked piece of clover, and over a wide ridge of drift-

ing sand; and there, right in front of us, lay the obvious cover from which our stragglers had escaped: an attractive-looking low pasture with a sluggish old stream called "Salt Creek" meandering through it. Here to our great delight we found hundreds of Shining Ladies' Tresses spread over a wide area.

VI. OVAL LADIES' TRESSES

(*Spiranthes ovalis*)

NAMES: COMMON: Oval Ladies' Tresses, Oval Tresses, Short Tresses. SPECIFIC: *ovalis* (Lindley, 1840), "oval," referring to the shape of the short spike which tapers at both ends.

PLANT: STEM: 8–24 in. high, rigidly erect. LEAVES: mostly basal, rather dark green, and glossy; long, lance-linear, blunt-pointed. SPIKE: several-ranked, short, trim, very uniformly spiralled, tapering both ways and oval in outline.

FLOWERS: Pure white, slender, tubular, 1/6–1/5 in. long, only slightly spreading at the mouth. SEPALS: narrow, lance-linear, not wide-spread. PETALS: similar, forming with the upper sepal the convexed half of the tube. LIP: dilated into rhomboid form at base, rounded and not much flared at apex.

PLACE AND TIME: DISTRIBUTION: Gulf States and Lower Mississippi Valley up to southern Indiana. HABITAT: shady moist woods and high wooded hills. SOIL PREFERENCE: neutral to slightly acid. SEASON: September–October at the north of its range.

SPECIAL FEATURE: Rigid stem with short spike of trim flowers in gently spiralled ranks.

THE Oval is the rarest and least known of all the Ladies' Tresses; it is also one of the most attractive—surprisingly different from the other several-ranked kinds. It owes its name to the shape of the flower-spike; this, being short and tapering both ways, is strikingly oval in outline. After its first discovery in Texas, it was long regarded as a small-flowered variety of the Nodding. While wide-spread about the Gulf States, it enters our territory only very sparingly.

In general, the plant is tall and slender. The leaves are mostly basal; long, narrow, lance-linear, blunt-pointed; dark-green and

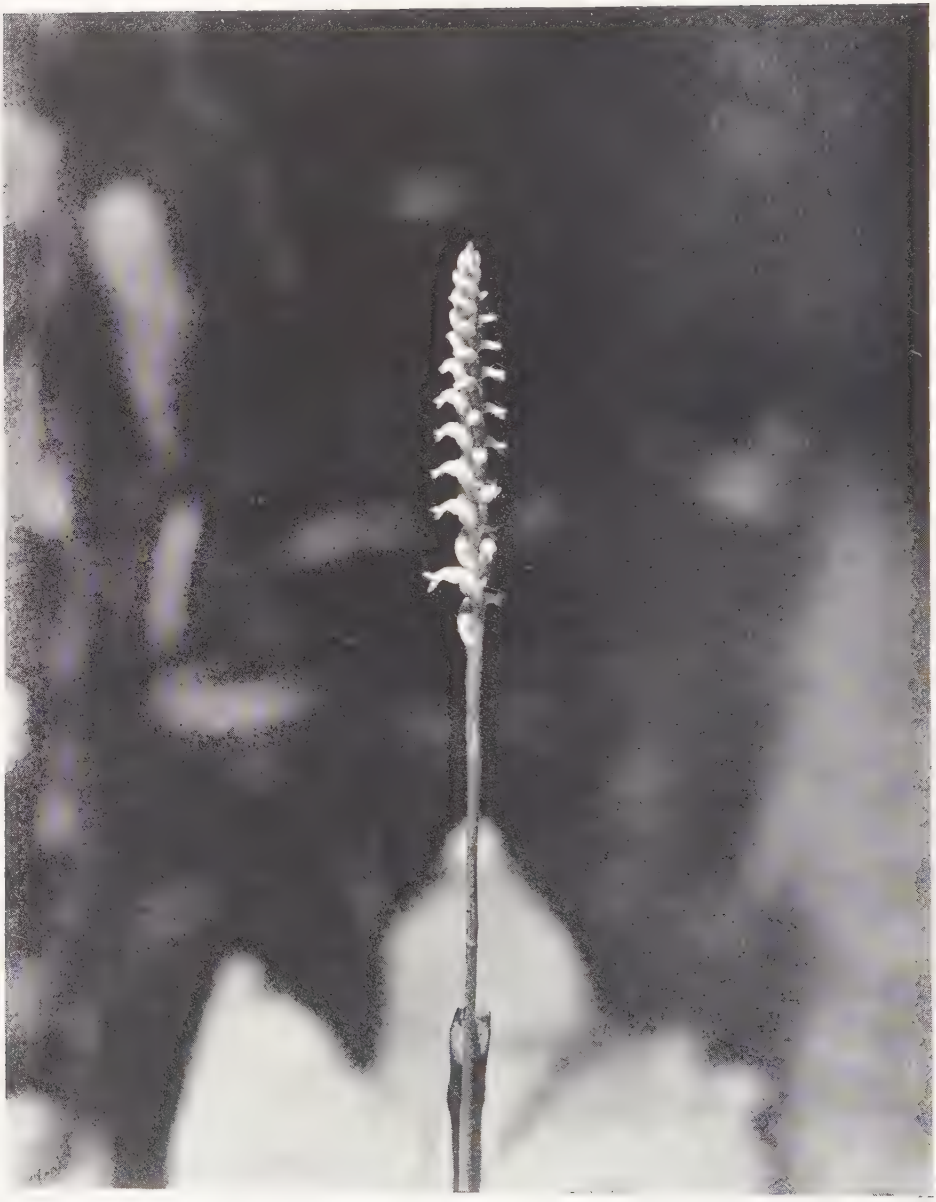

Plate 88

OVAL LADIES' TRESSES

(*Spiranthes ovalis*)

OVAL LADIES' TRESSES

(*Spiranthes ovalis*)

glossy. Occasionally there is a medium-sized leaf about one-third of the way up the stem, but the transition from basal leaves to bracts is usually abrupt and suggests the foliage-habit of the Alaska Orchid.

It is decidedly long-stemmed. In the Gulf States it reaches a height of two feet; and even where we saw it, at its northern limit, it frequently stands fifteen inches high, rigidly erect and very slender. Its appearance of being tall is greatly increased by the shortness of the floral spike. To test this out in the field we set a stem of the Nodding side by side with one of the Oval; both plants stood 14 inches high; the spike of the Nodding was over 4 inches long, that of the Oval barely 2. This habit of carrying all its flowers at the very summit of a tall upright stem is doubtless due to the plant growing in brushy cover at the edge of thickets.

In all the plants observed by us, the spike was uniformly arranged in three ranks, gently spiralled with about one-quarter turn; the flowers close-set but not crowded, and exquisite in their orderliness. They are very small and slender, tiny tubes like those of *Spiranthes gracilis*, but pure white and only slightly spreading at the mouth. No other several-ranked *Spiranthes* except the Shining has nearly such delicate little blossoms. The lip is widened at the base into a rhomboid, and then carried forward in a narrow oblong to a rounded tip only slightly crisped; altogether, it is so strap-like with its parallel sides and almost entire apex that we were at once reminded of *Habenaria dilatata*.

We found it very difficult to get trace of this orchid. A repeated appeal in "Rhodora" brought no response. Several promising clues gave out one after another; and at the close of the summer we were left with a single thread in our hands: at a word, if the plant showed up, we were ready to start for Courtney, Mo. And then, on Sept. 7 within a week of the flowering season, came word from Dr. Wherry, of the Washington Bureau of Chemistry, that he had found the plant.

With a view to field-work on the Phloxes of Indiana, he had visited Mr. Deam, the State Forester, whose private herbarium is a perfect treasure-house of the native *flora*. While glancing over some sheets of *Spiranthes cernua*, Dr. Wherry to his surprise discovered two of *Spiranthes ovalis*, and on inquiry was given directions to the station. Arrived there, he found it destroyed but close hard search in the neighborhood finally revealed a scattered colony of fifteen plants in tight bud. Five days later we were on the trail.

Like every new trail it had its thrills, and the most peculiar of these met us right at the start. We were seated on the hotel veranda at Evanston facing down a slope to the river valley below. Out of this, in front of us, rose a tall factory chimney; and at sundown we became aware of a great host of swifts, a flying column of thousands, circling furiously above the smoke-stack. Its mouth lay right in the path of their wide revolving ring. Once or twice while we watched, the speeding wheel reversed. Their eddying round seemed to end, as it began, right over the chimney-top; frequently single birds could be seen to drop down and hover, as though fascinated, at the yawning gape, and all the time scores kept disappearing. Then, just at dusk and the end of a round, suddenly, the multitudinous wheel began to pour in volumes down the open throat till they choked it and spilled over, only to be swallowed on the next round. Long before the last lone straggler vanished, the whole portentous thing was plain; it wasn't moths at a candle, it was bees to the hive! They had been having "one more last whirl" before going to bed; this was their community dwelling; the skyscraper had replaced the ancestral hollow tree. It was an extraordinary sight and reminded us vividly of boyhood days when we watched these birds at their nest-building, climbed up the old chimney stack, and with mirror and pole-handled scoop gathered in the much-coveted white eggs.

In some mysterious way this stirring of old memories filled

us with new zest for our trip; and in spite of a steadily mounting thermometer—starting at 95 degrees Fahr.—we reached John Ricker's farm bright and early next morning, after a long rough ride by trolley and flivver combined. John had been warned of our coming, and unhitching his mules from the harrow joined with intense interest in our search for the plant. Who knew but what this strange weed of the wild lands might find him a new market worth more than all his precious crop of sorghum?

We were as curious as John to examine the cover, which proved to be a series of low wooded hills. They were of the peculiar formation known as loess, a glacial deposit, fine-grained, fertile, very greasy in wet weather, and with the peculiar property of holding moisture in the dryest conditions. The orchid colonies had established themselves not in the damp hollows, but close to the tops of the knolls; and near them more than once we saw plants of a decidedly water-loving kind.

The slopes and knolls were lightly wooded with a variety of deciduous trees, none of them very large—elm, oak, sycamore, sweet gum, and tulip. The last was specially noticeable; Mr. Deam had mentioned it as characteristic, and it was quite curious how constantly we found it associated with colonies of Oval Ladies' Tresses. The shrubby growth included a great deal of Poison Ivy, Green Briar, and the American Papaw.

The orchid grew in small colonies about the thinly wooded fringe of thickety openings. Noteworthy among its plant associates were Ebony Spleenwort and Lily-leaved Liparis. But what interested us far more than either of these was *Spiranthes cernua*; it was only very occasional, never closely associated with *Spiranthes ovalis*, and always growing in much more open spots. As the Oval Ladies' Tresses had once been regarded as a mere variety of the Nodding, we found this evidence highly significant; indeed, it formed one of the chief delights of our trip to see how entirely different the new orchid was.

Tall, slender, and primly erect, its miniature spike so daintily

trim, and the tiny blossoms in such gently spiralled ranks, it had the clean-cut-ness of a cameo. The stem was usually taller than that of the more sturdy *Spiranthes cernua*, but the spike surmounting it less than half as long. It suggested in outline a well-grown short-eared stalk of wheat. Two things we remarked about the shortened raceme: the whole spike came into perfect bloom before even the lowest flowers showed any signs of fading; and the snow-white heads, silhouetted against the leafy green of their background, were a living witness to the name of Oval Ladies' Tresses.

VII. NODDING LADIES' TRESSES

(*Spiranthes cernua*)

NAMES: COMMON: Nodding Ladies' Tresses, Nodding Tresses, Autumn Tresses. SPECIFIC: *cernua* (Linnæus, 1753), "nodding," perhaps suggested by the long down-curving lip of the flower.

PLANT: STEM: leafy below, bracted above, 6–15 in. high. LEAVES: lance-linear, basal, fairly erect, like grass-blades, usually perishing at inflorescence. SPIKE: 1½–5 in. long, in several ranks; fairly uniform in bud, usually three-ranked; often in four vertical ranks when fully out.

FLOWERS: White, fragrant, ⅛–¼ in. long, uniformly tubular on lower half. SEPALS: lanceolate, about ⅜ in. long; upper one united with the petals, lateral pair free, somewhat spreading toward the apex. PETALS: connivent with upper sepal. LIP: about ½ in. long; ovate, crisped on apical margin and deflected immediately under peak of hood.

PLACE AND TIME: DISTRIBUTION: Nova Scotia in east to North Carolina, west to Mississippi Valley. HABITAT: moist pastures and springy slopes. SOIL PREFERENCE: apparently strongly acid. SEASON: July–October; in region of Great Lakes rarely before September.

SPECIAL FEATURE: Lateral sepals free, lip wide tongue-shaped, not contracted behind the apex.

Up north the Nodding is by long odds the favorite of all the Ladies' Tresses. Nor is it hard to guess the reason why: its best-beloved haunts are open grassy places, easy and pleasant of approach; and it comes to greet us at the close of the sum-

Plate 90

NODDING LADIES' TRESSES

(*Spiranthes cernua*)

Plate 91

NODDING LADIES' TRESSES

(*Spiranthes cernua*)

mer's long procession of flowers, smiling and nodding about springy meadows and banks. We say "nodding" and that is its name, but you will be quite wrong if you picture it with a drooping habit. The stem is erect and the flowers stand out at right angles every bit as sturdily as those of Romanzoff's but the peak of the hood is less boldly upturned, while the long lip below is much more deeply down-bent.

In general appearance the Nodding and the Hooded (Romanzoff's) are quite difficult to tell apart, and it is only by setting fresh stems of the two side by side when in flower that the amateur can be quite certain which is which. It is a sovereign remedy for swollen pride—like salt on a leech—to test out by actual experiment how inaccurate one's daily sense-impressions are and how many little details fail to find record. The first time we ever saw a spike of *Spiranthes cernua* was early one October; throughout the month of August that same season *Spiranthes Romanzoffiana* had been an almost daily sight. Yet we found a dozen points of detail in the new flower that we couldn't check up by our recollection of the old; we simply "hadn't noticed." And ten months later when Romanzoff's was on view again, half our precious store of autumn memories had faded. At last there came along a lucky year when their seasons overlapped and to our great delight we found colonies of the two in full bloom less than an hour's walk apart. In the hope of lending a friendly hand to some of our brethren in the craft we shall glance now and then at the Hooded in our description of the Nodding.

The plant springs from a bundle of slender fleshy roots, and consists of a small cluster of basal leaves and an erect flower-stalk. The leaves, which are long and grass-like, usually die down in the flowering season. The scape is bracted and topped by a spike of three (occasionally four) spirally-twisted ranks of crowded flowers. At first, with the buds nearly erect and close-pressed to the stem, the spike is very plainly three-ranked, the tiers obliquely ascending and quite uniform. But when it is in full flower and

the blossoms look out sideways at right angles to the stem, this characteristic spiral form usually disappears; quite often it takes on a new symmetry of four vertical columns—a St. Andrew's cross when viewed from above.

The flowers are fragrant, pure white with a crystalline texture as of snow, and more uniformly tubular than those of Romanzoff's. The upper half of the flower consists of three pieces only, not five as is the case with the Hooded; besides being free and thrust forward horizontally like a pair of cheek straps, the lateral sepals are longer, narrower, and more equal-sided than those of Romanzoff's, which are pronouncedly falcate.

The lip is long, broadly ovate, and widened on the outer half, which is boldly down-curved like a lolling tongue *directly underneath the peak* of the over-arching hood. In Romanzoff's, on the contrary, the lip is deflected at a point *almost under the middle* of the hood; the flower in profile is thus strongly "overhung," like a face with a very receding chin. Not only is the lip of the Nodding longer than that of the Hooded, but it entirely lacks the Kate-Greenaway waist or "fiddle" form which the latter owes to the sharp constriction of its sides below the tip. Finally, the pair of nipples near the base of the lip are quite prominent in the Nodding but nearly obsolete in the Hooded.

The Nodding Ladies' Tresses is never found in the heart of peat bogs, in sphagnum, or under the shade of evergreens; these are all haunts of Romanzoff's. When the two species are found together, it is a case of the Hooded climbing up to the slopes, as it often does, not that the Nodding has stepped down into the swamp. It dearly loves moist grassy banks and sloping pastures where there are abundant springs beneath the short turf; the rolling downs of a limestone district hardly ever fail of abundant colonies at their base.

No small part of its charm is due to the season at which it blooms; an autumn flower appearing when the asters and goldenrods hold sway in the fields. In the haunts where we have learned

to look for it, it often has the companionship of two of the loveliest of all our wild flowers, Fringed Gentian and Grass of Parnassus. In Ontario it rarely blooms before the first week of September; but it has a leisurely way that is quite delightful, and for more than a month it may be seen in profusion both budding and blooming about the countryside. In a mild open Fall it lasts till mid-October; but a single touch of Winter is enough, and one day when you visit some springy bank that yesterday was white with fragrant tresses, you will find not a trace; Jack Frost has been along with his shears and cropped them close. They are almost as difficult to see after flowering as when still in bud.

It was after we had had several years' acquaintance with *Spiranthes Romanzoffiana* that we first got our thrill of a new orchid over the Nodding Tresses. We were exploring a series of moraines, known locally as Monkey Mountain, overlooking Lake Ontario, on a day of early October, when we found this Ladies' Tresses in full bloom about the lower slopes of a small ravine overgrown below with thickets of cedar, while its grassy flanks and ridges were clad with pine. Many a bag of morels had we gathered under the evergreens here in May, and now in early October the sandy slopes and thin-turfed plateaus displayed scores of Giant Puffballs ranging in size from Grape Fruit to Hubbard Squash.

It made a most delightful diversion for us during the next two or three autumns, to trace the extent of these colonies of Nodding Ladies' Tresses in our neighborhood. At one point a few miles east lies a stretch of country almost on the edge of Lake Ontario, that in July and August is rife with Grape Ferns and Adder's Tongue, Loesel's Liparis and the Butterfly Orchid (*Habenaria psycodes*); here, no longer ago than last September we found hundreds of Nodding Tresses along with Kalm's Lobelia, Purple Gerardias (*G. paupercula*) and Gentians both Closed and Fringed.

And north for more than ten miles, over a stretch of rolling downs and sandy upland pastures intersected by tiny trout streams

and wooded glens, Nodding Ladies' Tresses bloom at every turn. All along the moist terraces and lower slopes, on springy banks and in grassy hollows, the little white spires can be seen, now by beds of Grass of Parnassus, now by sedgy marshes where Turtle Head, the Big Blue Lobelia, and at times the flaming Cardinal Flower make their home. Nothing ever seems to daunt it or to spoil the simple grace of this child of Autumn, the last of our season's orchids.

VIII. FRAGRANT LADIES' TRESSES

(*Spiranthes odorata*)

NAMES: COMMON: Fragrant Ladies' Tresses, Fragrant Tresses, Tidal Tresses. SPECIFIC: *odorata* (Nuttall, 1834), "fragrant."

PLANT: ROOTS: abundant, coarse, fleshy, freely stoloniferous. STEM: 1½–3½ ft. high. LEAVES: lance-linear, extending up stem; lowest 12–18 in. long, upper ones with long sheathing bases. SPIKE: 3–6 in. long, in 3 or 4 crowded spiralled ranks.

FLOWERS: White, creamy-tinged, about ⅓ in. long, very fragrant of vanilla. SEPALS: lanceolate, lateral pair free. PETALS: similar, connivent with upper sepal. LIP: white, yellowish-cushioned on median line; dilated into rhomboid at base, somewhat contracted above, blunt-tipped with wavy-crisped margins, nipples prominent.

PLACE AND TIME: DISTRIBUTION: Maryland and Virginia to Gulf States. HABITAT: wet ground, especially river-swamps, near the coast. SOIL PREFERENCE: moderate acidity. SEASON: September–December.

SPECIAL FEATURE: Large plants of wet marsh, freely stoloniferous, growing in dense clumps, flowers very fragrant.

THE Fragrant is as easily lord of the several-ranked group as the Giant is of the single; it is the largest of all the Ladies' Tresses, taller by nearly a foot than *Spiranthes præcox* and much stouter. Both plants, it is interesting to note, love thoroughly saturated stations where their roots are immersed in water. Its fragrance is like that of the Nodding, but fuller and more strongly toned with vanilla.

Plate 93

FRAGRANT LADIES' TRESSES

(*Spiranthes odorata*)

Plate 93

FRAGRANT LADIES' TRESSES

(*Spiranthes odorata*)

The plant frequently attains a height of three and a half feet, rising from a bundle of coarse fleshy roots. The stem is leafy for a foot or more from the base, the lowest leaf being very long and ribbony—15–20 in. Above this are two or three much smaller leaves with long-sheathing bases; and then comes a bracted scape supporting a thick crowded flower-spike 3–6 inches in length. The flowers are arranged in 3 or 4 ascending tiers; they are creamy white, rather strongly convex in outline and with side sepals spreading and free. The lip is widely rounded below, contracted above the middle, and flared near the apex with wavy-crisped margins; the nipples at the base are quite conspicuous.

Apart from its great stature, the most noticeable things about this orchid are the strength of the perfume and the readiness with which the long root-tips sprout into new plants (stolons). There is a remarkably fine station for it in the neighborhood of Washington—a tidal river marsh, many miles above brackish water, but submerged twice every twenty-four hours. This river stretch has other attractions to the Nature lover: it is a favorite haunt of the Marsh Wren; and along its margin has been found a most unusual form of the Tubercled Orchid known as Scutellate.

While in Maryland lately, rounding up the last of the Coral Roots, we paid this place a flying visit and shall attempt to record our impressions of the trip. Keyed up as we were with eager anticipation of a new orchid, almost everything that we saw seemed of unusual interest: and, after all, who knows what an important bearing such chance observations may have on the special plant's "ecology"? Crossing the Potomac into Virginia we parked our car at the top of a long steep hill, cut through a grove of trees, and then made our way obliquely down some sloping pasture land to the river.

Except for some magnificent Sweet Gums whose nuts were scattered profusely over the ground, the grove didn't at first sight appear very interesting. But jump with our reflection that autumn was no season for woodland flowers, we were brought to a sudden

halt; for there, right at our feet, stood a perfect little group of *Corallorrhiza odontorhiza*, the very Coral Root we had come in quest of.

On emerging from the woods we were met by a wonderful display of brilliant color—thousands of stems of Blazing Star; and farther on, in the damp thickety herbage at the foot of the slope we found a luxuriant growth of Closed Gentian, very large plants with magnificent flower-spikes of blue. But far more remarkable than these was the series of orchid discoveries made in crossing the grasslands: right at the edge of the wood Beck's Ladies' Tresses, farther out on the slope a colony of Slender, and at its base some scattered stems of Nodding—surely a unique set of stepping-stones to *Spiranthes odorata*.

Long before we came in sight of the Fragrant Ladies' Tresses, a spicy breath of vanilla was wafted upstream to our nostrils. Near the edge of the marsh was a fringe of trees which screened the bank from our view; and, eager though we were to "follow our noses," a sudden shower forced us to run to cover. The delay was not without its recompense, for near the scattered trees where we sheltered we found two very interesting plants: Climbing Bone-Set—an entirely new thing to us all, and both forms of the Ternate Grape-Fern (*dissectum* as well as *obliquum*).

The tide was now just about at low ebb; so as soon as the sky cleared, we pushed through a thicket of dogwood and button bush to the river margin; just stopping on the way to examine a Marsh Wren's nest placed conspicuously beside our path in the waist-high jungle of reeds. It was one of the decoy nests built at some distance from the cunningly hidden little cradle in which the eggs are laid.

The marsh river border was almost entirely grown up with beds of tall Scirpus, Cat-tails, and the European Yellow Iris, escaped from a lily-pond some ten miles up-stream. In parts of this jungle dodder was extraordinarily abundant, its tangled skeins looking like some kind of aerial Gold-thread. There was

also wild rice in profusion and a glory of color from Large Blue Lobelias, Cardinal Flowers and Bur Marigolds.

But our eyes that day were slaves to another sense, and looking down-stream we beheld great masses of snow-white spikes, the stems of *Spiranthes odorata*. They stood more than knee-high, but decidedly lax and leaning for support on the dense vegetation about them. Their foliage, however, was in perfect condition, and the plants were obviously healthy and flourishing. As with the Nodding, the spikes took two forms, a regular three-ranked spiral, and a more disorderly broken arrangement in which a fourth rank appeared intermittently. The flowers had no trace of green in their white, but just a faint creamy tinge on the under-side of the lip; this we could trace, as in *Spiranthes vernalis*, to a pair of fleshy cushions flanking the median line.

These great beds of monster white Ladies' Tresses shedding their perfume over a full quarter-mile stretch of drowned river-valley were certainly very impressive. There must have been thousands, ten to fifty in a clump, and the clumps in close succession as far as eye could see.

IX. HOODED LADIES' TRESSES

(*Spiranthes Romanzoffiana*)

NAMES: COMMON: Hooded Ladies' Tresses, Hooded Tresses, Romanzoff's Tresses. SPECIFIC: *Romanzoffiana* (Chamisso, 1828), "Romanzoff's."

PLANT: STEM: 3–24 in. in height; leafy below, leafy-bracted above. LEAVES: lance-oblong to linear, basal, usually perishing at inflorescence. SPIKE: cylindrical, dense, in three regularly spiralled ranks.

FLOWERS: White or creamy white, fragrant as of almonds, bulbous on basal half, strongly overhung, ⅓ in. long. SEPALS: ovate; lateral pair somewhat falcate, connivent with upper sepal and petals. PETALS: lance-ovate, compacted with the 3 sepals into a hood. LIP: fiddle-shaped; widely rounded below, contracted above middle, and dilated at apex into an entire-edged, rounded, strongly deflected tip; nipples inconspicuous.

PLACE AND TIME: DISTRIBUTION: transcontinental; Newfoundland–New England in east, west to Alaska, British Columbia, Oregon, and California;

found also in Ireland. HABITAT: swamp cover, both sedgy and wooded; moist turf and boggy spots. SOIL PREFERENCE: neutral, but fairly tolerant; when growing in sphagnum the roots tap the underlying soil. SEASON: July September.

SPECIAL FEATURE: Flowers with sepals and petals all united into a hood; lip pandurate.

ROMANZOFF's or the Hooded has the widest range of all the Ladies' Tresses. It extends from the Pacific slopes to the Atlantic, being found in the west from Alaska to California, and in the east from Labrador to New England and New York. It has even, in some miraculous way, established itself in Ireland! In the region of the Great Lakes it is very abundant, flowering from early in July till the close of August and even later.

The plant grows anywhere from 6 to over 20 inches in height and is leafy below, leafy-bracted above. The spike is usually dense, longer and more tapering than that of the Nodding Tresses. It nearly always consists of three strongly marked ascending spirals. The individual blossoms are more bulbous at the base and more "ringent" or gaping than those of *Spiranthes cernua*; this is due to the lateral sepals being included with the petals in the galea or helmet above, and the lip being much shorter. Owing to the backs of the sepals having a greenish or creamy tinge, one misses something of that snow-white purity so pleasing in the Nodding Tresses.

The upper half of the flower forms an overarching hood of five pieces all "ironed" closely together; it is convex at the base, concaved forward of the middle and strongly upturned at the apex. The lip below is very strongly deflected at a point considerably short of the hood's peak, with the effect of a receding chin; its outline when spread flat is "pandurate" or fiddle-shaped, the basal two-thirds being widely rounded, the sides farther forward contracted to a narrow neck and the apex dilated again into an obtuse tip.

Plate 64

HOODED LADIES' TRESSES

(*Spiranthes Romanzoffiana*)

Plate 95

HOODED LADIES' TRESSES

(*Spiranthes Romanzoffiana*)

On close inspection it will be found that the nipples on the upper surface of the lip near its base are small and inconspicuous; moreover, the mandibles of the beak at the top of the column are quite short and more widely separate than those of the Nodding.

It is not so fastidious in its choice of a home as the Nodding, and though most abundant in wet bogs it is also found in fairly dry situations. In peat bogs it grows freely in the open, both in sphagnum and among sedges, less abundantly under cover of cedars; here it is frequently found in the companionship of the Small Green Wood Orchid (*Habenaria clavellata*), the Blunt-leaf (*Habenaria obtusata*), Loesel's Liparis, and the Green Adder's Mouth (*Malaxis unifolia*). Occasional plants of it are often to be seen in moist grass and about the shallow depressions of rocky plateaus; in such places we have usually found plentiful traces of bog flora in its neighborhood, such as Virginia Chain Fern and Sundew.

In Algonquin Park, which is entirely a forest area, Romanzoff's Tresses is a familiar sight in the open spaces, about moist sand and on gravelly lake margins, often side by side with the little Bog Club Moss (*L. inundatum*). Yellow-eyed Grass (*Xyris*), Long-leaved Sundew, Horned Bladderwort, and the Small Green Wood Orchid. Curiously enough it is nowhere plentiful in the forest itself, even where conditions seem almost ideal; but once it wins to the open, it multiplies as if by magic. Twenty minutes' paddle from an island camp well known to two of us lies a beaver pond in the heart of the forest. Deer trails through the spruce and hemlock lead to it from all sides and its sandy margins are dotted with hoof-prints. Here among sedges, sundews, clubmosses and no fewer than four kinds of Bladderwort—including the Small Purple (*Utr. resupinata*) and the Humped (*Utr. gibba*)—Hooded Tresses are very abundant.

We well remember our first find of this now familiar orchid. We had been invited out for a day in the field by a past master of the craft; it was only our second season, and we were quite

elated at the honor of sharing his company. Our way led through the heart of a huge heavily wooded swamp with alternating belts of tamarac, spruce, and cedar, which we were told contained nearly thirty species of orchid besides many other rare and interesting plants. Only the knowledge that we were free to return as often as we liked and explore every last corner of these mossy woods kept us from lagging behind. Our objective lay some distance beyond—a partly drained huckleberry marsh about half a mile wide. In spite of its size it was quite difficult to find in the heart of this great wooded swamp. It had just trees enough scattered over its surface to keep us forever guessing about our direction and our whereabouts. The huckleberries were almost knee-deep and the July sun was glaring down from a cloudless sky. If it was a hard place to find, it was apparently a still harder place to lose, and the tramp seemed endless. At last, however, our guide pointed to a clump of pines some quarter-mile distant where the plants he had promised to show us were growing.

Just at this moment, while still struggling through thickets of huckleberry, one of us suddenly had the sensation of about six inches of hat-pin jabbed viciously through the calf of his leg into the very centre of his being. The hat-pin was of course only a bee sting, but apparently it had penetrated a vein and made walking so painful that the victim was obliged to rest while the others went on. They agreed to return in an hour and share all their discoveries without reserve. It was during this interval of enforced idleness that our disabled nature-lover found his first plant of Hooded Ladies' Tresses.

We shall never forget it, nor the mingled suspense and excitement of watching on successive trips the buds gradually unfold till we could tell what species this was with the beautifully symmetrical three-ranked spiral of closely plaited creamy blossoms all facing out sideways in ascending tiers. There is a suggestion of almonds about its fragrance which is peculiarly refreshing. Like so many scents, it has a strange power of reviving scenes out of the

distant past. When the sight of it fails to rouse these far-off days, a single sniff will often stir a whole hive of memories.

The very last meeting we had with this famous "Irish-American" added a fresh item to our record of its haunts. We were making our way about a small island lake almost entirely shut in by granite cliffs. On the weather-worn rocks and smooth-bevelled boulders at one end of the lake were dark-green patches of *Selaginella rupestris*, that interesting little ally of the Club Mosses; Pale Corydalis, Wild Columbine and Early Saxifrage were abundant on the slopes; above them we came to a grassy plateau surrounded with thickets of Blueberry, spreading Juniper and Sweet Fern; here we found Bluebells and Slender Ladies' Tresses growing; and in the very middle of it, behold! three tall spikes of Romanzoff's blooming bravely in a cushion of yellow-green sphagnum.

XIII

RATTLESNAKE PLANTAIN (*EPIPACTIS*)

I. MENZIES' RATTLESNAKE PLANTAIN

(*Epipactis decipiens*)

NAMES: COMMON: Menzies' Rattlesnake, Western Rattlesnake. GENERIC: *Epipactis* (Boehmer, from Haller), a classical plant-name. SPECIFIC: *decipiens* (Hooker, 1839), "deceiving," because of its misleading appearance with features midway between Ladies' Tresses and Rattlesnake Plantains.

PLANT: STEM: tall and stiff, 14–18 in. high, glandular-hairy above. LEAVES: long, narrow, lanceolate, dark green, strongly to faintly veined with white. SPIKE: tapering, strongly one-sided, 3½–5 in. long.

FLOWERS: Very long for the group, ¼–⅜ in. in length. SEPALS: green, whitish-margined below, ⅓–⅜ in. long. PETALS: white, green-streaked on line of contact with upper sepal, clawed at base, dilated outward above into fluke-like blades. LIP: white, ¼ in. long, bulbous rather than saccate on basal half; apical half a slightly down-curved grooved spout tapering to a blunt tip. STIGMA: prolonged in a narrow beak of two converging mandibles twice as long as stigmatic disc.

PLACE AND TIME: DISTRIBUTION: transcontinental in north; Maritime Provinces to Alberta and British Columbia down through the Rockies and on Pacific Coast to California and New Mexico; rare in Eastern United States, northern Maine and Michigan. HABITAT: dry floors and slopes of evergreen forest. SOIL PREFERENCE: never tested; probably indifferent; abundant in its range on both granite and limestone. SEASON: July–September.

SPECIAL FEATURE: Plant tall, spike one-sided, lip elongate, barely saccate.

MENZIES' is perhaps the most interesting of all the Rattlesnake Plantains and certainly one of the handsomest. Though abundant both east and west, it is decidedly rare in our own home territory; and, for orchid-lovers at least, to light on a big patch of it in some dark grove of evergreens is "a sicht for sair een." Like many another plant it has had more than one christening. Its barely saccate lip and the leaves often devoid of white markings bring it very close to the Ladies' Tresses; and

Plate 96

MENZIES' RATTLESNAKE PLANTAIN

(*Epipactis decipiens*)

Plate 97

MENZIES' RATTLESNAKE PLANTAIN

(*Epipactis decipiens*)

that is the group to which it was first assigned, under the name of "deceiving" (*decipiens*).

The plant is tall, often a foot and a half high, and slender in all its parts, the leaves as narrow sometimes as those of a willow, and the one-sided spikes very long and tapering. The white marking of the foliage, while very variable, is frequently more or less "pinnate" in form—a broad stripe down the mid rib that branches out this way and that in flickering lines over the two leaf wings. The flowers, which are much longer than those of any other species, are "centred" on the top of the ovary and continue its line of direction, instead of being slung over one side as the more strongly saccate kinds all are. The "spout" or apical half of the lip is long and only slightly curved—an extended platform like that of the Tesselated; and both these plants, it is of interest to note, have the correlated feature of a prolonged stigmatic beak.

It is exclusively a denizen of dry coniferous woods, so dry that we always marvel at its luxuriance of living flower and foliage in the baking droughts of August. Like the Lesser, it is peculiarly fond of terraced slopes and plateaus, and its flower spikes almost invariably "face out" from the background of bank, stone, tree, or dark shade. In our camping grounds of Algonquin Park we meet it occasionally, but it is far from vigorous there. In the Lake Huron region, however, only one hundred miles west, it is every bit as luxuriant as on the Pacific slope. Many years ago, while "summering" on Manitoulin Island, we found it everywhere; and a year or two later on a fern-hunting trip at the base of the Bruce Peninsula we frequently saw its leaf-rosettes.

Just how abundant it is there, was very strikingly brought home to us three seasons ago. With a view to camera-work later, we had spent a very busy fortnight rounding up orchids. Three of the four Rattlesnake Plantains had been found within easy reach of headquarters; and now we were motoring back from the Fish-

ing Islands full of glee at an amazing double stroke of luck—*Habenaria unalascensis* and *Listera convallarioides*! The road we were travelling was entirely strange to us, till all at once, as our looks roved idly over the landscape, we were halted by a stretch of the Rocky Saugeen valley, spanned at this point by an old stone bridge. Bridge, river, and steep wooded bank beyond, all looked strangely familiar; and a single glance at the limestone bluff to the east brought the whole thing back to us.

Twelve years before, we had spent half a day scouring the face of that cliff in search of a long-lost colony of Oregon Cliff Brake; more than that, we had been struck by the size of some Menzies' leaf-rosettes on the wooded slope. Now Menzies' was the one Rattlesnake Plantain needed to complete our list! To dodge down a side road behind the bluff was the work of a moment; and in less than ten minutes our old fern tracks had become an orchid trail. The new bent served to guide us to a spot we had left unexplored on the previous trip—a small coniferous wood just back of the cliff.

Here we counted over two hundred plants of Menzies'; alongside a single fallen spruce a patch of twenty leaf-rosettes in addition to some smaller colonies. They were extraordinarily vigorous, most of them with well-advanced flowering spikes already in June. The foliage showed great extremes of variation from a wide-ovate form quite boldly marked with white to a very narrow type without any markings at all. It was an ideal station, just what we most wanted to complete our study of the Rattlesnake Plantains, and the camera man was in high delight.

Never had we seen so luxuriant a growth before; and yet from pure sentiment and for old sake's sake we wouldn't sacrifice, for a whole acre of these lusty giants, even a single one of our Algonquin colonies. It was there that we had first found Menzies', and its very rarity added zest to our search for it season after season. It was endeared to us by a score of happy memories; and if all the rivals from Alaska to Labrador had

ever had a chance to supplant it, their noses were finally put out of joint the day of our great adventure on Birch Island.

We had no sooner settled down into camp that season than we noticed day after day a doe come down a certain deer path to browse at our thicket of hazel. As a rule we avoided these trails for fear of alarming our woodland guests. Curiosity, however, got the better of us one morning and we determined to follow her tracks. Just over the ridge of the island the trail brought up suddenly at a sort of natural stockade; windfalls of balsam and spruce on three sides of it, and on the fourth a giant log of white pine—moss-grown relic of pioneer days. Just outside the stockade we presently noticed a small colony of Menzies' Rattlesnake Plantain, six flowering stems growing together; this was about the record for our Park finds and easily the best on the island. And then seeing some more leaf-rosettes just over the barrier, we crawled in under one of the fallen spruces; ten more plants, and every one Menzies'! It was the champion station of all our Algonquin days.

While we were still gloating over our find we felt that uncanny sense of being watched that one sometimes gets. Facing about, we saw at the foot of a small balsam, lying in a bed of leaves and partly screened by some honeysuckle sprays, a tiny spotted fawn. It had been sleeping curled up and was now staring at us with head slightly raised. In its quiet steady gaze there was no sign of fear or surprise, and presently it snuggled down to sleep again. Stealing cautiously away, we hurried back to camp for a camera.

On our return we found the fawn still asleep, and though it raised its head two or three times and stared at us, it always nestled down for another snooze. We took several snaps of it, and at last one of us, tip-toeing round the stockade, thrust a hand through the brush behind it and stroked its back, twice, with his finger tips. This was too much! Twitching its skin violently as though to dislodge a fly and with a restless movement of the ears,

it jumped to its feet and bounded away; at a few yards off it stopped to take a last look at us before disappearing into the woods. A week later when we surprised it resting under the butt of a fallen birch, it had already learned its first lesson of fear.

Never again did we see it back in its bed of leaves by the balsam; but regularly every season pleasant memories of the scene recur when stems of our cherished colony of Menzies' spring up from the leaf-rosettes and thrust out long channelled lips from their flowering spikes.

II. TESSELATED RATTLESNAKE PLANTAIN

(*Epipactis tesselata*)

NAMES: COMMON: Tesselated Goodyer's, Loddiges' Rattlesnake. SPECIFIC: *tesselata* (Loddiges, 1824), "tesselated"—of the leaf pattern.

PLANT: STEM: 5–10 in. or more in height. LEAVES: ovate to lance-oblong, 1–3 in. long, strongly or weakly net-veined with white. SPIKE: an all-round spiral of more or less crowded flowers.

FLOWERS: White, strongly saccate, somewhat ringent, 1/5–1/4 in. long. SEPALS: wide-rounded at base, sharp pointed; upper one upturned at peak; lateral pair free, somewhat spreading. PETALS: united with upper sepal into a helmet. LIP: strongly saccate at base, apical half oblong, blunt-pointed, shallow-grooved, slightly deflected. STIGMA: teeth at top of column longer than stigmatic disc.

PLACE AND TIME: DISTRIBUTION: Maritime Provinces and New England west to Ontario, New York and Michigan. HABITAT: damp woods, evergreen and deciduous. SOIL PREFERENCE: moderate acidity. SEASON: July–September.

SPECIAL FEATURE: Spike not one-sided. Lip strongly saccate, oblong, blunt-tipped.

THE "Tesselated" Rattlesnake Plantain was first described by Conrad Loddiges in 1824, but did not become generally known till listed in the 1908 edition of Gray. For nearly a century it played the part of a joker or double, being taken now for the Lesser, now for the Downy or for Menzies'. Throughout its somewhat restricted range, it shares "living-quarters" with all the other three members of the family circle.

Plate 98

TESSELATED RATTLESNAKE PLANTAIN

(*Goodyera tesselata*)

Plate 69

TESSELATED RATTLESNAKE PLANTAIN

(*Epipactis tesselata*)

It is rather larger than *Epipactis ophioides*; and the leaves, while very variable, do not taper so abruptly to a point. The spike is many-flowered, not one-sided but in the form of a loose all-round spiral of several ranks. The flowers are white, occasionally pinkish in the bud, rather larger than those of the Lesser and with the peak of the hood only upturned instead of strongly recurved. The lip is like that of the Lesser in its saccate base, but unlike in the spout, which is broad-oblong, blunt-pointed, shallow-troughed, and only slightly deflected.

The usual home for this orchid is upland coniferous woods; but it is by no means confined to evergreens and appears to relish moister conditions than the Lesser. In the mountain districts of New England it flourishes in damp groves of evergreens, where the Lesser is both rare and weakly. It seems to be pretty generally distributed in Ontario; not seldom occupying deciduous woods, but always near hemlock groves or in the shade of cedar, balsam and spruce. In such haunts its favorite station is low damp floors, especially among decaying stumps and logs overgrown with moss. Only last summer while hunting Bog Malaxis at Thunder Cape, we came upon a beautiful illustration of this orchid's habitat: a level-floored wood of spruce and mixed growth; at one corner, in a dry thin carpet of moss and needles covering some rock flats, a colony of the Lesser; at another, in a low damp dell without any granite outcropping, a beautiful colony of Tesselated.

It was camping on a wooded island of Cache Lake that first brought Loddiges' Rattlesnake Plantain to our notice. And we seldom think of this orchid without thanking our stars for the happy thought that came to us one August of pitching our tent on Birch Island. To it we owe seven summers of delightful communion with Nature and a well-filled wallet of wood-lore. Every season taught us so many secrets of wild life that we could hardly endure the delays of the journey, so eager were we to get under canvas once more. The beauty of it was, our revela-

tions came unsought; some of the best of them actually as we pored over these quaint and puzzling checkered Plantains.

They were very abundant on the island, even occasional Menzies' as well as the Lesser and the Tesselated. And always, of course, no matter what particular trail we were on, we had our weather eye open for orchids. Summer after summer we tramped the length and breadth of the island, hunting for ferns, club-mosses and flowers, watching birds and animals, or stalking "small deer" in the shape of Longhorn Beetles about blossoming shrubs and sappy windfalls. And sooner or later, every season, when the flowering spikes opened we settled down to hobnob with the Rattlesnake Plantains.

As it happened, several little colonies of the Tesselated grew right on our lot at the corner of Birch Plateau—our favorite conning tower of observations. It was while searching here for their leaf-rosettes one morning that we noticed the big mink of Floating Pine Jetty three times evict an enterprising muskrat from its summer quarters under our dock. Here, too, that a pair of Pileated Woodpeckers suddenly swooped down beside us to excavate a rotten stump for the grubs; and here, again, that we watched two shrew-mice about the bigness of Stagbeetles engage in a battle royal under a "tump" of blueberries.

One day while seated under the pines at our camp table making a careful comparison of the Tesselated with spikes of Menzies' and the Lesser, we heard a gentle clucking come down the slope toward us. Looking up we saw a hen partridge mount guard on the top of a near-by log while her five chicks foraged under the brackens for bunch-berries; presently Dame Partlet fell asleep to her own crooning, and the chicks began to run in and out between our feet picking up crumbs.

Our whole trouble those days with Loddiges' was that none of the botanies listed it. Three kinds only of Rattlesnake Plantain were mentioned; and as one of these, the Downy, did not occur in the region, all the plants that we met we took for either Men-

zies' or the Lesser. Yet it was obvious even to the naked eye that three distinct forms grew in the woods all about us. Naturally we came to the conclusion that our plants on Birch Plateau with strongly saccate lip and prolonged stigmatic beak must be a cross between the Lesser and Menzies'. And then came the new edition of Gray which stamped our plants as a genuine species and gave us reliable "earmarks" to distinguish it. But so many intermediate forms abounded that we felt very strongly the need of some better testing ground than the Park where three of the species all occurred together.

This we found the very next season and, as often happens, by the purest accident. While hunting for Slender Ladies' Tresses about the shores of a certain woodland lake, we were suddenly overtaken by a thunderstorm and forced to take shelter. To this and nothing else we owe our discovery of Loddiges' Rattlesnake Plantain. For it was while crouching in a thicket of evergreens that we spied it. There were three patches, growing under small spruces in a carpet of moss, and all showing spikes of bloom.

When the storm passed we made a thorough search and in less than an hour discovered seven more colonies, under hemlocks and about the mossy covering of rotten stumps and logs in a bush of mixed growth. The floor of the wood was rather damp, low and level, in places showing an outcrop of limestone flats. The only other orchids in sight were seed stalks of Bracted Orchid and of Striped Coral Root. High and low we searched in vain for other species of Rattlesnake Plantain: Menzies' does not occur in the region; the Downy is extremely rare; and of the Lesser there was never a trace. At last we had actually got a "pure culture."

The plants were very evidently all of one race; the leaves ovate, rather pale green and not very strongly tesselated; the spikes many-flowered, but neither crowded nor one-sided. And the individual blossoms were not only all alike, but quite clearly different from those of the Lesser. They were Loddiges' as plain

as the nose on their face, and the "nose" in every instance was flattish, broad, blunt, and only slightly deflexed. Finally, on our return to camp that evening we stripped the perianth from some of the blossoms and discovered under the lens that our new find had a long beak of tapering mandibles at the top of the column.

We look upon this as one of the reddest of red-letter days in all our annals; for it solved a very knotty problem that had bothered us for years, and established in our minds once and for all the genuineness of *Epipactis tesselata*.

III. LESSER RATTLESNAKE PLANTAIN

(*Epipactis repens, var. ophioides*)

NAMES: COMMON: Lesser Rattlesnake, Creeping Goodyer's, Little Lattice-leaves. SPECIFIC: *repens* (Linnæus, 1753), "creeping"—of the rootstock; var. *ophioides* (Fernald, 1908), "snake-like," from the mottled leaves.

PLANT: STEM: 4–10 in. high, a bracted scape, glandular-pubescent, with a basal rosette of alternate leaves. LEAVES: rather dark green veined with a network of white in spreading confluent lines, ovate to lance-oblong, ½–1¼ in. long. SPIKE: one-sided in 3 or 4 vertical ranks, 1½–2 in. long.

FLOWERS: White tinged with green, ringent, saccate, ⅛–¼ in. long. SEPALS: lateral pair free, horizontal, scarcely spreading. PETALS: united with upper sepal into a hood, upturned and recurved at peak. LIP: strongly saccate at base, apical half narrowing to an acute point, strongly deflected and with sides sharply up-creased from median line. STIGMA: teeth of beak at top of column shorter than the stigmatic disc.

PLACE AND TIME: DISTRIBUTION: transcontinental, Labrador, Newfoundland and New England in east, south to Carolina, west to Mississippi Valley. HABITAT: cold mossy woods, chiefly evergreen. SOIL PREFERENCE: strongly acid, but probably tolerant of moderate acidity. SEASON: July–August or occasionally September.

SPECIAL FEATURE: Lip strongly saccate, tapering to a sharp point and strongly deflected on apical half.

THE Creeping or Lesser is the "most travelled" of all its little group. In the northern hemisphere it has actually girdled the earth. It is a very rare plant in Great Britain and we owe the household name of "Rattlesnake Plantain" to the early settlers of

[illegible]

LESSER RATTLESNAKE PLANTAIN

(*Epipactis repens, var. ophioid[illegible]*)

Plate 101

LESSER RATTLESNAKE PLANTAIN

(*Epipactis repens, var. ophioides*)

New England. The quaintly marked leaves of one species or another were no doubt a familiar sight in the forest and came to be regarded with superstitious awe as an antidote to snake bite.

Our plant of the northeast (*Epipactis ophioides*) is slightly smaller than the type form (*Epipactis repens*) as found in Europe and also in the extreme north and west of our own continent. It consists of a fleshy creeping rootstock and a very short leafy stem from whose tip springs an erect flowering scape. So short is the stem that its alternate leaves form a basal tuft or rosette. They are short, broad, and abruptly tapering, quite the stubbiest of all these chequered "plantains." In color they are dark bluish-green variegated with a cross-pattern of white, or occasionally brownish, lines; the markings spread laterally beyond the veins into broad bands often confluent near the tip of the leaf.

The scape is surmounted by a loose, even few-flowered, spike which is strongly one-sided, the more or less alternate blossoms converging on their pedicels so that all face the same way. The flowers are white tinged with green on the backs and edges. The pair of petals are united with the upper sepal into a hood with upturned peak; the lateral sepals are free and slightly spreading. The lip is strongly saccate at the base, being deepened into a vertical pouch. Its apical half forms a narrow down-bent spout, deeply troughed by the upcreasing of the sides and tapering to a sharp point at the tip.

A curious thing about the shape of the lip is its correlation with the stigmatic beak. When the spout is short, as in the Downy, or strongly deflected, as here, the beak of the stigma is also quite short; but if the spout projects to any distance, as in Loddiges' and Menzies', then the mandibles of the rostellum are correspondingly lengthened. The same feature may be observed among Ladies' Tresses. Romanzoff's "receding chin" has its hidden counterpart in a short stigmatic beak, the Nodding's "protruding tongue" in a long one.

The natural home of this orchid is cool coniferous forests.

While occasionally found in damp almost swampy groves, it much prefers dry stations. In Vermont and throughout the Adirondacks it is frequent in cold spruce swamps and upland woods of mixed growth. It seems to have a special affinity for hemlock, and may nearly always be looked for with confidence wherever groves of this beautiful conifer still stand. Like Menzies'—the only other with a one-sided inflorescence—it is very fond of steep slopes, often appearing in small groups on rock-ledges and even growing on loose moss-covered stones under hemlocks or in beds of spruce needles. During a visit to New Brunswick recently we met it frequently in the evergreen woods back of Passamaquoddy Bay. The pretty little flower-stems standing up in their rosettes of quaintly checkered leaves were very attractive, like glints of sunshine in the depths of the forest.

For two of us the Lesser Rattlesnake Plantain always brings to mind Algonquin Park and the voyage of adventure that brought us our champion station for this orchid. In much the same latitude as northern Michigan and Maine, these Highlands of Ontario are a vast Lake District and Forest Reserve rolled in one. They have always been a favorite camping ground with us; and returning one season full of eagerness to renew old acquaintance, we found to our dismay the woods behind our tent shorn of their hemlock, and the Rattlesnake Plantains no more. To take the bad taste out of our mouths, we determined to spend the whole of next day in a grand round of Cache Lake, visiting all our favorite haunts.

No sooner was breakfast over than we launched our canoe and headed straight for the "Islands of Adventure," as we called them, where so many unseen hands were beckoning us. On nearing Sharp Shin Point we slowed up, partly to watch for the stems of Dortmann's Lobelia that grew in the shoaly water, but also in the hope of surprising our friend the fisherman on the flat stone at the bend. Sure enough, there he was.

No sooner did the July drought bring that rock above the

water line than it became the favorite perch of a mink, as ardent a sportsman as we have ever met. The first time we saw him we tried to scare him by suddenly heading his way as we paddled past. But the laugh was on us; for as the canoe approached, he rose erect and, snuffing the breeze, ran down the side of the stone, plunged into the water, and swimming straight for us, tried to clamber aboard over the gunwale! We were travelling down wind, and he had caught the whiff of bass in the stern of our craft.

After rounding the bend we paddled leisurely along toward the Madawaska Channel, on the look-out for two of our favorite birds, the Waxwings that hawked for flies out over the bay, and the Olive-sided Flycatchers with their loud clear call from the tops of dead spruce. Then skirting past Birch Island Cove where the pair of beavers used to come and feed on the alders at sundown, we headed for Eyrie Cliff—the only island station we have ever discovered for the Fragrant Fern. Here we doubled Long Point and made for the open water beyond, all set for the finest view in the Park.

It was while we were drifting along in full sight of that magnificent northeast shore line with its granite cliffs and the wooded slopes of Skymount and Outlook, that the inspiration came to us. There before our eyes were hemlock groves in abundance, pine bluffs, and stretches of spruce—why not search for our lost orchids here? Suiting our action to the words, we headed for a long narrow bay running in to the heart of the forest.

Little did we dream what discoveries of after-days awaited us in that hinterland of mystery: the high-walled ravine where the big tufts of Fragrant Fern were hidden; the naked scarp whose shelves and seams were filled with rare Crag Woodsia (*W. scopulina*); and Yellow Jacket Pass, where close to the foot of a silver birch we found our first colonies of Lance-leaved Grape Ferns and spent a whole hour of unalloyed bliss crawling about among them; bliss that came to a sudden end when we

looked up and saw dangling over our heads three large gray-paper Chinese lanterns—great populous nests of wasps.

Half-way up the bay we beached our canoe and waded through a thicket of blueberries into the forest. It was almost entirely of evergreens and filled with such colonies of Rattlesnake Plantains as we had never seen before. They were growing everywhere; in hemlock groves, among spruces, under pines; on the low benches that ran in from the shore, along the mossy terraces of steep slopes, on the smooth flanks and even on the tops of bluffs.

The most curious station of all was the heart of a swamp at the head of the bay. It was a very wet swamp, in parts almost submerged through beavers damming its central stream; but at its widest point we found a big stand of spruces supporting on their roots a solid floor of leaf mould and needles high and dry above swamp level. And there, secure in their forest fastness and moated about with alder runs, among Wintergreen and Twinflowers, Prince's Pine and Pyrolas, grew Rattlesnake Plantains in great profusion. There were even occasional spikes of Menzies'; the Tesselated was quite frequent; and as for the Lesser—well! we had never seen it so abundant, and to this day "Spruce Island" remains our record station.

IV. DOWNY RATTLESNAKE PLANTAIN

(*Epipactis pubescens*)

NAMES: Common: Downy Rattlesnake, Downy Lattice-leaves. Specific: *pubescens* (Willdenow, 1805), "downy."

PLANT: Stem: stout, pubescent, 6–16 in. high. Leaves: 5–8, in a rosette, bluish green covered with an intricate network of white, the bounding lines fine and not spreading laterally or confluent; wide ovate, 1½–2¼ in. long on long winged petioles. Spike: stout, cylindrical, blunt-topped, not one-sided, 1¼–4¼ in. long.

FLOWERS: White, globose, 1/6–¼ in. across. Sepals: ovate; lateral pair rounded on lower half, slightly spreading. Petals: similar, contiguous on adjacent edges toward apex. Lip: globose and bulging in all directions, partly

embracing the short broadly triangular apex, which appears as a wide gaping spout at the forward brim of the sac. STIGMA: beak of stigmatic disc made up of two very short blunt teeth.

PLACE AND TIME: DISTRIBÙTION: Quebec and New England south to Virginia and North Carolina, west to Mississippi Valley. HABITAT: dry woods, mixed or evergreen; found under pine, hemlock, and hardwood, usually on level floors. SOIL PREFERENCE: moderate acidity. SEASON: July–September.

SPECIAL FEATURE: Leaf pattern finely reticulate; spike not one-sided, lip ventricose.

THE Downy is probably the most familiar of all the Rattlesnake Plantains. It is large enough to be quite conspicuous, and instead of shrinking far from the haunts of men it delights in open well-frequented woods. Long years after Loddiges' and the Lesser have fled before axe and saw, the Downy lives on undaunted, decorating the floor of woodlot and sugar-bush. Its leaf-rosettes, to our mind, are peculiarly beautiful, so delicately patterned with a network of white.

The plant is tall and stout, hardly so tall as Menzies' but thicker-set. The leaves are wide oval, bluish-green in color and overlaid with a very intricate pattern of white; its meshes more numerous than in any of the others, its bounding lines fine and often gracefully curved instead of angling into oblongs and squares. The inflorescence, a true spiral like that of the Tesselated, is all-round instead of one-sided,—a dense blunt-pointed cone of globular flowers, the lip-bases so fully inflated as to envelop part of the short wide-gaping spout; altogether, a very striking contrast to Menzies'.

Its home is in dry woods, both dense and open, usually hardwoods with a sprinkling of evergreen. It has a fondness for the neighborhood of hemlock, white pine or balsam, and is frequently associated with various saprophytes. We have more than once found it growing luxuriantly in the same woods as Crane-fly and Putty Root; covers always remarkable for their abundance of Coral Roots, Beech Drops, and Indian Pipe.

Our favorite station for it is a mixed wood some five miles north of Lake Ontario; not very dense, but large enough to hide for several seasons from our prying looks at least half a dozen colonies of the Downy, and so rich by its happy union of dry plateau and springy dell shaded with pine, hemlock, beech and maple, that it still holds surprises after twenty years of close acquaintance.

It is approached by one of the most romantic and beautiful old lanes that we know of anywhere, so long disused as to have gone wild again; bordered on one side by a line of glacial boulders and field stone, on the other by a weathered old stump fence made of giant pine roots; the centre entirely grown up with turf and the borders beautified with ferns and flowering plants, a miracle of sweetness in the last week of June when sweetbriar in profusion and wild grape-vine festooning the pine roots burst into bloom. As it nears the wood the path drops between sandy banks to cross a little gully threaded by a cress-mantled stream of ice-cold water, and then mounts the farther slope among shrubberies of evergreen to a plateau of silver birch.

We have never been able to agree whether this wood yielded richer treasure-trove of bird-lore or of plants. It was here that we found our first Oven-bird's nest, saw our first Scarlet Tanager, and heard for the first time the Rose-breasted Grosbeak in full song. Here, too, we added four new ferns to our list and three orchids, besides a host of other flowering plants of interest. On one thing only we are all agreed, and with it happily our disputing nearly always ends: it was here that we met the biggest bird-adventure of all our ramblings, and we owed it entirely to the Downy Rattlesnake Plantain.

For several seasons after our discovery of the Downy we could find no flowering spikes. Then late one fall in an out-of-the-way nook we discovered a colony of very robust plants with three seed stalks. Experience with the Lesser had taught us that the plant gave promise of flowering quite early in the season,

Plate 102

DOWNY RATTLESNAKE PLANTAIN

(*Epipactis pubescens*)

Plate 103

DOWNY RATTLESNAKE PLANTAIN

(*Epipactis pubescens*)

and hardly was spring well under way before we set out on our quest.

As we sighted the wood in the distance we left the road intending to cut across a rough upland pasture dotted with glacial boulders and pools of water. While in the act of scaling the fence we heard right over our heads a strange bubbling call and looking up saw a fairly large bird with long narrow wings hovering hawklike above us; it was so near and so clearly silhouetted against the sky that we could actually see a movement of the throat—a kind of stiffening and craning forward—as the bird uttered its call, a long spurt of sound, beginning low and rising in a bubbling whistle to die away in a plaintive plover-wail—"Pr-r-r-r-r-ee-eep-wee-ee-eu." This was our first meeting with the Bartramian Sandpiper or Upland Plover, prelude to a whole chapter of exciting discoveries. We never tired of listening to their wild music, and watching them settle with that quaint trick of raising the wings erect over the back till the tips came together and then folding them slowly down to the sides.

The birds had just arrived on their spring migration, and for a week or more remained tame and delightfully vocal; then suddenly all was still; the birds turned shy and secretive, and even when flushed uttered no sound. As soon as the young were fledged, the birds, still wild and alert, resumed their music—an unforgetable cry. Before the season was over we had found a nest with eggs in it and had traced their breeding grounds for two or three miles along the south side of a ridge said to mark an ancient beach of Lake Ontario.

You may well imagine how utterly, for an hour or more, we forgot our quest of the Downy, and then when we had come back to earth how eagerly we hailed the omen and raced for our orchid colony assured of a lucky day. And so it proved; there was ample promise, and three months later we saw our first spikes of the Downy come out into blossom.

This part of the wood was very dry in the late summer and

even in May and June could hardly be called rich, but something in the quality of the leaf mould was apparently ideal for saprophytes. Twice we have found clumps of Pinesap there; two seasons ago we discovered Squawroot; and last year we counted over one hundred spikes of Large Coral Root; some of the spikes were in full bloom on July 1, and on the 2d of September some late-flowering plants were still perfectly fresh.

Most of the patches of Downy Rattlesnake Plantain in this wood are small, and all of them situated on shady plateaus overlooking a deep ravine or within a few yards of the edge. The largest colony is in an open grove of deciduous trees; the others lie in the shade of hemlock and white pine. None of them flower at all freely; an occasional spike every two or three seasons is all we have ever found. But that doesn't deter us a bit in repeated pilgrimages to look at the leaf-rosettes,—November or March, it makes no difference,—fresh green leaves overlaid with a delicate network of white.

XIV

PONTHIEU'S ORCHID (*PONTHIEVA*)

PONTHIEU'S ORCHID

(*Ponthieva racemosa*)

NAMES: Common: Ponthieu's Orchid, Ponthieu's Broad-head, Shadow-witch. Generic: *Ponthieva* (R. Brown, 1813), "Ponthieu's"—a French botanist; Specific: *racemosa* (Walter, 1788), "racemose," of the wide floral spike.

PLANT: With stout fleshy roots and a rootstock, producing a basal leaf rosette and an erect flowering scape 10–14 inches high. Leaves: rich glossy green with a satiny lustre and frosted over with fine silvery pubescence; thin, delicate, 2–3 in. long, ovate, tapering below into broad petioles. Raceme: 4–6 in. long; loose, the flowers on stout, ascendant half-inch ovary-pedicels.

FLOWERS: White, green-veined, resupinate, lip uppermost; 12–18 in number, nearly ½ in. across. Sepals: white, tinged with green and reddish, marked with 3 green stripes, ¼ in. long, ovate to lance-oblong, spreading; lateral pair concave and somewhat falcate; middle one below and in front, its tip cohering with and supporting the pair of petals. Petals: white, veined with yellowish green, 1/5–¼ in. long; thrust out from midway up column on divergent clawed bases; above, dilated outwards into a pair of fluke-like semi-hastate blades, unequal-sided, adjacent edges contiguous. Lip: white, palmately ribbed with green veins; produced half way up column on a clawed base so as to stand at the back as the upper part of the flower; 1/5–¼ in. long; upcurved above base and expanded into a pair of round wings that are folded to the sides of the big knobbed column-head, forming a vase-like nectary and terminating above in a curved pointed spur.

PLACE AND TIME: Distribution: Virginia to Florida; also West Indies, Central and South America. Habitat: Often in shell marl, on lower edges of muddy sloughs and woodland ponds. Soil Preference: neutral to slightly acid. Season: September–October at north of range; December–January farther south.

SPECIAL FEATURE: Lip uppermost, white, upcurved, cruse-like.

Ponthieu's Orchid was not known to occur within our limits till 1920. The late Professor Grimes had good reason indeed to be proud of his field work that year, for between June and September he discovered both *Isotria affinis* and *Ponthieva race-*

mosa in southeastern Virginia, a "farthest south" and a "farthest north" record for these two plants. Ponthieva abounds in Central and South America, and is fairly well known from Florida to the Carolinas. Its nearest affinities are tropical orchids; but it belongs to the same tribe as the Pogonias and Ladies' Tresses, and bears not a few resemblances to the Rattlesnake Plantains.

The scape springs from a tuft of basal leaves. Its upper part, as well as the scattered raceme, is delicately frosted with a glandular pubescence. The flowers are pale greenish white, thrust well out from the stem and tilted back so as to face up. They are set the reverse way from most orchid blossoms. The lip stands above the column, at the back, on the side next the stem; while the petals and middle sepal face it on the lower or outer half. Both petals and lip are raised above the ring of sepals, standing clear on stalked bases half way up the column.

It is very interesting to see how the flower-parts have been adapted to the position they hold. The petals, no longer needed to roof over the column, are thrust out below, and to keep their spreading wings from flying apart the adjacent corners are stuck tightly down to the tip of the underlying sepal. The result is an insect-platform braced and supported as on a spring. The mechanism of the lip is even more remarkable. In order to form an open hollow vase, it rises almost erect and folds its widely rounded lateral lobes like a pair of wings to the sides of the column; the floor within is alluringly spread with golden nectar; the mouth of the vase is armed fore and aft with two slender beaks—the rostellum in front below, and above it, behind, the sharp upcurved little spur of the lip apex.

It was a big day that brought us our first sight of Ponthieva, big both for labor and for harvest. On paper it had looked simple enough: the plants were growing by the margin of a certain east-to-west river in Southern Virginia; all we had to do was to work up-stream along the north bank till we reached the place. But in the field things wore a very different complexion. The whole

Plate 104

PONTHIEU'S ORCHID

(*Ponthieva racemosa*)

Plate 105

PONTHIEU'S ORCHID

(*Ponthieva racemosa*)

country was heavily wooded and rough, gouged out in every direction by broad thickety treacherous sloughs that forced us into heart-breaking detours. The biggest and worst of these came, fortunately, first; but the memory of toiling and floundering up that west bank in vain search for a crossing is a nightmare still. Long before we gained the head of it we were heartily sick of our packs, our quest, our calling; any hobo's lot seemed better than a botanist's. And then at the point of despair we met a brother of the craft, a gladiolus-grower from Illinois, who cheerfully unhitched his mule and showed us a hidden trail through the woods to a pontoon of logs.

No sooner were we safe across than a complete reaction set in. For one thing, while struggling along by that slough of despond we had made a most welcome find, a tight little colony of *Corallorrhiza odontorhiza* in perfect bloom. In Maryland two days before it hadn't yet opened; so here was a golden opportunity, our very first, for good pictures, and we promised ourselves a speedy return. And then as we worked our way down-stream, nearly opposite this lucky spot, we made one of the strangest discoveries of all our tramping days—fruiting stalks of a little plant, unmistakably an orchid, entirely new to us and even to Gray's Flora—*Malaxis spicata*. Actually until this very season of 1927, its northern limit was supposed to be Florida! For the rest of the day, whenever we thought of it, our spirits trod on air.

But it wasn't for faded spikes of Florida Malaxis that we were packing a big camera through Virginia woods. By the time we had worked down-stream far enough to take up again the general direction of our route, afternoon was upon us; and in desperation we struck out on a compass line for the point on the river where Ponthieva ought to be. But the going was very bad and full of detours. Some of the boggy troughs took about all we had, and the fiendish green-briar, snarled up in thicket after thicket of prickly holly, not only drew blood but frazzled our nerves.

Success when it came was as sudden as it was complete. In late

afternoon while trying to pick our way across one of the swampy bottoms, we stepped right up to a colony of Ponthieva—a whole square yard of them! They lay in deep shade near the mouth of the slough, just above water level in the boggy margin that flanked the central channel. This was their favorite situation; our later finds were in almost identical spots. Moreover, they had an index plant that more than once flagged us to their hidden bower—the Spice Bush. By using these wrinkles next day we found a still larger colony close by our group of Little Autumn Coral Root.

To our disappointment, the plants in this first colony had only two flowering spikes, both awkward-looking subjects for the camera. So we made the desperate resolve of trying for more. But we had no luck; the next patch, a quarter of a mile farther on, showed nothing but foliage tufts; and in the end we had to do the best we could with our first find. It was a struggle against odds; thickety surroundings, a tricky breeze, poor light—the sun alarmingly low; and on top of all this a growing dread of being overtaken by night in these trackless woods with their criss-cross sloughs and cat-briar entanglements.

While quite disappointing to photograph, because of the flattish blossoms meeting the lens edge-on, we found this orchid peculiarly interesting to the eye. From the ground up there was something unique about almost every feature. The leaves were satiny-soft and glossy, remarkably thin, and lax; even in the most obviously flourishing plants they often lay limp on the ground, sometimes actually moulded to the contour of the debris beneath. The silvery pubescence of the upper scape and raceme was very attractive; and the flowers themselves were so different from anything we had ever seen before as to fairly fascinate us. The clawed stalks of the petals and lip, we found, were decurrent to the foot of the column in the form of fleshy ridges. The delicate coloring of the perianth parts proved due to a spreading of green veins from near their base that tinged the whole

surface of the white blades; this was particularly noticeable in the lip—a beautiful piece of decorative design.

A thing that completely puzzled at first was how the pollen-sacs, embedded in slots high up on the outer face of the column, could possibly come in contact with an insect visitor reaching in to the nectary from the petal-platform below. And then we noticed that one of the flowers had its rostellum tipped with a little bead of moisture. Touching a stem of grass to this, we found to our amazement on drawing it away, that it pulled both pairs of pollen spindles bodily out of their pockets. The dew-drop was glue, and an invisible thread ran down the beak of the column to the pollen chamber below. It was a pay-as-you-enter plan, and not a tippler could escape scot-free. The same device of mucilage and thread is used by the Bog Malaxis, whose flowers, curiously enough, are also set with the lip uppermost.

Altogether, you may readily guess, we found this first sight of Ponthieva too brief by far to satisfy. Small as the flower was, it fairly brimmed with novel and surprising features; the landing-stage of wedded petals; the lip with its honeyed floor, its wings and beak; the fantastic column with its big knob-kerrie head—a cabinet of curios all by itself. It was tantalizing to have found it only in the closing hour of its season, and we were filled with desire some lucky year to watch it through from bud to blossom.

IV

TRIBE OF THE TREE ORCHID

	GENUS
XV. Adder's Mouth . . .	*Malaxis*
XVI. False Twayblade . . .	*Liparis*
XVII. Calypso	*Calypso*
XVIII. Crane-fly	*Tipularia*
XIX. Putty Root	*Aplectrum*
XX. Coral Root	*Corallorrhiza*
XXI. Crested Coral Root .	*Hexalectris*

XV

ADDER'S MOUTH (*MALAXIS*)

I. BOG ADDER'S MOUTH

(*Malaxis paludosa*)

NAMES: Common: Bog Adder's Mouth, Bog Tenderwort, Bud-leaves. Generic: *Malaxis* (Swartz, 1800), "soft" or "delicate" plant—"Tenderwort"; Specific: *paludosa* (Linnæus, 1753), "marsh"- or "bog"-loving.

PLANT: Stem: produced from a small biennial corm, pale yellowish green, smooth, angled, 2–6 in. high. Leaves: in a basal cluster of 3–5, pale green, smooth, oval, ⅛–¾ in. long; tips of larger leaves bearing 3 or 4 tiny bulbils. Spike: 1½–3 in. high, usually longer than the scape, narrow, crowded with small short-pedicelled, bracted flowers.

FLOWERS: Yellowish green, 15–30 in number, resupinate, lip uppermost, on pedicels with a *double* twist, 2/9 in. long. Sepals: ⅛ in. long; middle one below, deflected; lateral pair above, erect behind the lip. Petals: pale green, wide-spread at sides, reflexed; less than 1/16 in. long. Lip: pale green with three thread-lines of grass-green running lengthwise down the face. 1/16 in. long, erect in front of and between the lateral sepals.

PLACE AND TIME: Distribution: Ontario (Thunder Cape), Minnesota (Otter Tail and Clearwater Cos.), Alaska (Ketchikan). Also in Europe and Asia. Habitat: in bogs, growing in moss, especially decaying sphagnum; occasionally lodged in rotten bark. Soil Preference: never tested, probably acid, the corms being in contact with moss and bark. Season: July and August.

SPECIAL FEATURE: Leaves several, tipped with bulbils; Flowers short-pedicelled, lip uppermost.

The Bog Adder's Mouth or Malaxis is famous in Europe as the smallest and most inaccessible of Old World orchids. It grows in sphagnum, and its favorite haunts are quaking bogs and the treacherous borders of mountain tarns. It nearly always has a romantic setting—the wild beauty of the Welsh hills, for example, where it is frequently found in the company of Butterwort and Sundew. Until about twenty years ago, no one suspected that this little orchid was native to the New World as

Plate 166

BOG ADDER'S MOUTH

(*Malaxis paludosa*)

Plate 107

BOG ADDER'S MOUTH

(*Malaxis paludosa*)

well as the Old. And then, suddenly, four stations were discovered one after another; two in Minnesota, one in Alaska, one in Ontario.

The last of these records, a single plant discovered by Prof. Cowles of the University of Chicago, fired us Ontarians with a wild desire to find this famous midget of the orchid world. One solitary specimen seen in the region of Thunder Cape! It was certainly looking for a needle in a very big haystack, as all who know the Sleeping Giant will admit; but it offered a sporting chance and we took it. It was hard to give up our projected trip to the Gaspé, for our partners had brought back glowing accounts of the *flora*, and we were most eager to sample it for ourselves—especially its crowning wonders of Moonwort and Auricled Twayblade. But duty prevailed—and the lure of an unblazed trail.

At our very first plunge into North Shore forests we discovered a hidden lake with floating bogs above and below full of the most delightful things: Ladies' Tresses and Fragrant White Rein-orchid, Narrow-leaved Sundew, Dwarf Primula and Arctic Raspberry, all in flower together. These quaking margins seemed to us ideal cover for *Malaxis paludosa*, but in spite of the most careful search we could see no trace of it.

Next day we tried a new direction in the hope of finding sphagnous cover of a somewhat different sort, and in less than an hour came to the edge of a glorious big spruce bog filled with sphagnum, loose and compact, moist and dry, in hummocks and hollows and level carpets. A sluggish peaty stream, haunt of beaver and muskrat, wound its way down the whole length of it. In we plunged, through alder thickets and shrubberies of heath, to where the stands of spruce, white cedar, balsam and tamarac seemed to shout orchids their loudest.

For half the morning we scoured this tract relentlessly, but with no greater reward than hosts of Heart-leaved Twayblade and the common orchids of the north—Blunt-leaf, Tall Leafy Greens and Whites, and occasional clumps of Yellow Lady

Slipper. The usual home of the orchid in England is floating sphagnum; so we concentrated our search on the wettest mats and cushions of moss we could find, but without result.

Then we remembered that the sphagnous tract, where the solitary plant had been found, was "open," just like most of the British boglands; with that, we shifted our efforts to an old logging road that led invitingly into the heart of the bog. Our search under cover of the spruces had been close enough in all conscience, but here we made it closer still. In every little stretch of the path—moist, wet, and dry, slope, hollow, and hillock—we got down on our knees and making fine-tooth combs of our eyes raked over every square inch of its surface.

What a revelation of Nature's wealth and variety! Mingled with the sphagnum in the spongy turf of the bog-floor were two or three other kinds of moss, gray cup-tipped lichens, tiny toadstools with shirt-button caps, hundreds of small sedge blades and stems with brown fruiting clusters, seedlings of Dwarf Cornel and Naked Bishop's Cap; Star-flower, Goldthread, Swamp Violet, Bed Straw, Marsh Bluebell; delicate trailing wreaths of Cranberry and Twinflower; little stalks of Wool-grass and Horsetail: Starry Wild Lily-of-the-Valley, Single-flowered and One-sided Pyrolas, lush coppery sprouts of Wintergreen, Grass-of-Parnassus and Round-leaved Sundew; rigid yellow-green bristly stems of Shining Club Moss with almost the form of the northern *L. selago,* and—now reddish, now pure dark green, with mealy white grains of macrospores showing in their upper axils—spikes of the rare little *Selaginella selaginoides.*

Grass-of-Parnassus, Cranberry, Sundew, and this little Selaginella all together—surely the auguries were good! Back and forth we plied with our fine-tooth combs, and suddenly, right in the middle of the path, as though it had just risen out of the ground before us, stood a delicate 2-inch flowering spike of yellow-green; a glance at the base revealed a cluster of three small leaves half-buried in the moss and supported on a corm.

There was hardly room for doubt, but in fear and trembling we examined the raceme of flowers; it was very similar to that of *Malaxis monophyllos*, but slightly stouter, more crowded, and decidedly yellow-green. And then for the flowers; sure enough! above, an ovate erect little petal of a lip backed by a pair of big rabbit's ears of sepals; below, two strongly recurved lateral petals, and, deflected between them, the middle sepal: *Malaxis paludosa*, beyond the shadow of a doubt. It was for curiosity's sake, not further proof, that we now drew out our lens to examine a leaf-tip. Yes! there they were, though not quite as the books described—two or three little white specks like fruiting dots of a fern: the bulbils that, added to the annual corm and the spike of seed capsules, give the plant a third string to its bow in propagation.

But first and last it was the spike of flowers that fascinated most: in general outline so exactly like the White Adder's Mouth, but in color so distinct; and then the reversed position of the perianth parts, brought about so strangely by a double twist of the pedicel instead of none at all. Small as it was, the lip was the only part that had anything of ornament—three grass-green lines running vertically down the face of it.

We hadn't much more than examined the plant, before we were summoned to lunch. And in the interval between leaving and returning a most extraordinary thing happened, a miracle that made us rub our eyes and stare as at a vision of the Gaspé we had so heroically turned our backs on. Round the borders of this same bog, and in both cases within a few feet of *Malaxis paludosa*, we found, first—Moonwort! and then—Auricled Twayblade!! You will get some idea how all-engrossing the Bog Malaxis was, when we frankly admit that these other two finds made little or no impression at the time.

As soon and as often as we could we returned to our spruce bog, and spent many hours in the fascinating work of finding more Bog Malaxis and making field notes. It was quite uncanny

how hard the plant was to see, though it had practically no cover to hide it; its leaf-cluster was sunk in the moss and there was nothing in its stem, of color or contour, to make it stand out from its surroundings. At the spot where our first find was made—a patch perhaps six feet across—we presently counted seven plants, then twelve, and eventually fifteen.

Wherever it had once established itself it seemed to spread. At three other points we found colonies of twelve to eighteen plants similar to this first one; and while exploring a branch trail we discovered the most curious station of all; two spruce logs had been laid side by side on the border of the path; the groove between them was filled with moist crumble of decayed spruce needles, cone-scales and cedar twigs; a patch of dry sphagnum occupied the end of one of the logs, and right in the groove beside it stood a row—the Seven Sisters, we called them—of flowering plants of Bog Malaxis. They matured earlier than those in the moss; already when we first found them the ovaries had begun to swell.

This was not the only place where we saw these orchids growing *off the ground*, as it were, like epiphytes; twice we met with a plant raised above the moss in the side of a cedar stump, once in a cleft of loose bark and once in a little tuft of gray lichen. In most cases it had its corm nestling in sphagnum; and it seemed to prefer little slopes or ridges where the moss-and-sedge floor of the logging road was lifted above bog level by stumps and underground roots. The sphagnum in which it grew was usually well mixed with other mosses and a variety of small sedges and flowering plants; in short, it preferred a bed of soft bog-turf to loose sphagnum; and after a little practice we were able to "spot" the kind of corner that it most frequented—rich, moist, and nearly always open.

It was quite curious how true to type in this last particular the plant kept. Three hours' close search along these "pulp" roads netted us fifty plants; the same time spent in wooded cover

yielded only five; and even these were in lightly shaded spots where the underbrush had not encroached—a patch of sphagnum under tall alders, rabbit runways, and deer paths.

That evening we drafted a prodigious telegram containing such "magic spells of gramarye" as *Woodsia alpina*, *Aspidium fragrans*, *Botrychium lunaria*, *Listera auriculata* and *Malaxis paludosa*. Passing through the hands of one ship's captain and three despatchers, it came letter-perfect next day to our partners in Buffalo and brought them post-haste to the spot to help put *Malaxis paludosa* on the map.

II. FLORIDA ADDER'S MOUTH

(*Malaxis spicata*)

NAMES: COMMON: Florida Adder's Mouth, Two-leaved Tenderwort, Little Orange-lip. SPECIFIC: *spicata* (Swartz, 1788), "spiked."

PLANT: STEM: a naked scape 4–6 or 7 in. high, with a pair of sheathing leaves at base. LEAVES: 2, nearly opposite, on thin sheathing bases; blades, broad-ovate, 1¼–1¾ in. long. SPIKE: 1–3 in. long, considerably elongated during inflorescence, loose, nearly ½ in. wide.

FLOWERS: Green marked with orange or vermilion; resupinate, lip uppermost, on ¼ in. pedicels. SEPALS: pale green, 1/11–1/10 in. long; lateral pair oblong with rounded tips, erect behind lip at top of flower; middle one, longer, lanceolate, thrust forward below. PETALS: green, thread-like, reflexed. LIP: uppermost, erect in front of lateral sepals; wide cordate, with pointed tip and pair of pronounced basal auricles partly embracing the column; central shield of lip orange, drying to vermilion; margins and auricles yellow and more or less hyaline.

PLACE AND TIME: DISTRIBUTION: Bahamas and West Indies to Florida; also sparsely up coast to Virginia. HABITAT: (in Virginia) about the wooded margins of sloughs and ponds, in shell marl. SOIL PREFERENCE: neutral. SEASON: end of July to August at north of range; August–September in Florida; November–February in West Indies.

SPECIAL FEATURE: Two-leaved, flowers long-pedicelled, resupinate.

THE discovery of Florida Adder's Mouth in Virginia came as a great surprise in 1927. It has several features that link it closely up with both the Green and the White, while the set of its flowers is precisely that of the Bog Adder's Mouth. It is,

however, almost a tropical orchid, and between it and *Malaxis paludosa* lie all the length and breadth of "Gray's territory."

In less than a year this rare little orchid has already given us two of our biggest thrills. At the end of September 1927, while following the trail of Ponthieu's Orchid through a thicket of catbriar, we came upon two fruiting stems of what at first we took for *Malaxis monophyllos*; but the capsules stood out on long thread-like stalks, and—more mystifying still—each plant had a pair of leaves. On inquiry we learned that similar specimens had been found that same season in an adjoining corner of southeastern Virginia and identified at Washington as *Malaxis spicata*.

Well! if we had to make still another last trip to the south next season, we vowed it should be a record one, and it was. Luck was with us from the start. At the very entrance to our favorite "Asplenium Paradise," where Pinnatifid, Mountain, and Bradley's Spleenwort flourish, we passed a steep rocky bank overgrown with Butterfly Pea, and near it the Dayflower with its quaint little pair of poised wings in the purest of blue, both things of beauty and entirely new to our northern eyes. Then deep in the heart of a wet wooded gorge we saw spikes of Spotted Phlox standing 6 feet high. In Maryland the Purple Fringeless was at the height of its flowering season, and such a season as it seldom has; while just across the border in grasslands rich with spikes of the Yellow Fringed, we came upon some of the very finest colonies of Spring Ladies' Tresses we have ever seen.

On our early morning drive out of Richmond, we lived over again all the delights of our stay in New Jersey: road-borders rich with gay-colored Milkworts, Lobelias and Yellow-eyed Grass, wood-edges breathing of Pepper-bush, and deep bowery meadows where Crested and White Fringed Orchids lifted their spires amid a wilderness of Rhexias, Sabatias, and Partridge Peas. One new flower that we met made a special appeal, the dainty little Ruellia, with its delicate trumpet flares of bloom.

Before we knew it, the end was in sight. After hour upon hour

Plate 108

FLORIDA ADDER'S MOUTH

(*Malaxis spicata*)

Plate 109

FLORIDA ADDER'S MOUTH

(*Malaxis spicata*)

of steady driving, we suddenly turned down a side road and almost at once drew up on the shore of a little woodland lake. Within five minutes of parking our car we had reached the home of the Florida Adder's Mouth. But for the pair of leaves, it might well have been either the Green or the White. Just which, would be hard to say. The pale green of the foliage and its loosely sheathing bases suggested the White; so did the length of the floral spike, but its width and the long slender pedicels were those of the Green. The flowers themselves, except for the petals, were almost exactly as in *Malaxis paludosa*.

The somewhat cordate lip stood erect right back of the column, with a pair of rabbit-ears of sepals just behind it. But the base of the lip was produced below into a pair of lance-oblong auricles embracing the sides of the column. The petals were thread-like and strongly reflexed. The perianth in general was pale greenish, but the lip was yellow with a heart-shaped shield of orange-vermilion at the centre. It needed a lens to reveal all this, and before we put it away, it told us something more surprising still. The Florida Malaxis has learned the same wrinkle as Bog Malaxis! The flowers have *regained* their old-time position with the lip at the top by a *double* twist of their stalks.

The wooded slopes where Malaxis grew had many points of interest. Besides Christmas Fern, Virginia and Ternate Grape Ferns, we saw quite a lot of Netted Chain-fern in the hollows, and up on the knolls the Ebony Spleenwort. The banks and dells were crowded with flowering stems of Crane-fly; Downy Rattlesnake Plantain, Green Adder's Mouth and Liparis—Loesel's as well as the Lily-leaved—were frequent about our path. More delightful still were rosettes of Ponthieu's Orchid and—greatest wonder of all!—a magnificent flowering stem of Crested Coral Root. We had been told a surprise awaited us here, but we never dreamed of this—Florida Malaxis in the midst of Ponthieva rosettes and Hexalectris in full bloom a few yards away.

Only the photographer had ever seen the Crested Coral Root

before, and that away down in Tennessee. Its large fragrant flowers so strikingly colored—buff, dusted with gray, and brown-purple striped—were a joy to behold. It was only a single spike, but it gave our leader his cue; and next morning he took us to a secret spot in a wood where we saw a whole score of Hexalectris stems at the height of their bloom.

Its presence on the shore of this woodland lake gave us our first clue to the probable story of Florida Malaxis. Hexalectris revels in limestone regions; and wherever the coastal "shell-marl" gives them the food they crave, its wind-blown seeds will germinate. And that is, no doubt, how Malaxis and, probably, Ponthieva have worked their way into Virginia. It was in shell-marl that, the autumn before, we had found our two spikes of *Malaxis spicata* and all the colonies of Ponthieu's Orchid. The lake margin here was strewn with broken shells, and among them flourished *Hexalectris, Ponthieva* and *Malaxis spicata.* To make assurance doubly sure, there stood the big-leaved Golden Ragwort, a most inveterate calcium-addict. Following this double clue of shells and Senecio right up the slope, we actually found at the top a second colony—small but flourishing—of Florida Malaxis.

Our stay was all too short, but it gave us time to do what we love to do—make a second round of it all and fix the scene in our mind. And there it stands to this day: the woodland lake, its winding shores and shaded slopes; the margin of a little cove, the crest of a knoll that overlooks it, and all their wealth of orchid treasures; Rattlesnake Plantain, Crane-fly, Adder's Mouth and Liparis; Ponthieva, Crested Coral Root and best of all, companioned now by next-of-kin and now by fellow-southerners, this newest and rarest of settlers in Virginia, the Florida Malaxis.

III. WHITE ADDER'S MOUTH

(*Malaxis monophyllos, var. brachypoda*)

NAMES: COMMON: White Adder's Mouth, Narrow Adder's Mouth, Pale-leaf, Tenderwort. SPECIFIC: *mon phyllos* (Linnæus, 1753), "single-leafed," var. *brachypoda* (Asa Gray), "short-pedicelled."

PLANT: STEM: a naked scape produced from a corm, 4–6 in. high, slender, pale green, with sheathing leaf near base. LEAF: ovate with long sheathing petiole. SPIKE: narrow, elongated, 2–3½ in. long, taller than the scape, barely ⅓ in. wide, crowded with tiny flowers.

FLOWERS: Pale greenish white, nearly sessile, ⅕ in. long. SEPALS: whitish, linear-oblong, pointed, recurved on margins, 1/11 in. long; upper one erect, lateral pair deflected. PETALS: greenish white, linear, strongly reflexed. LIP: 1/10–1/12 in. long; basal half wide-rounded, abruptly contracted at middle, apical half lance-linear, tapering to a sharp point.

PLACE AND TIME: DISTRIBUTION: Labrador and Newfoundland, through New England to Pennsylvania, west to Manitoba and Minnesota; also Texas and California. The New World form differs from the Eurasian *M. monophyllos* in having the flowers with lip inferior instead of resupinate. HABITAT: Low damp mossy wood floors, chiefly in swamps. SOIL PREFERENCE: neutral or slightly acid; very abundant in limestone regions. SEASON: June–August.

SPECIAL FEATURE: Flowers short-pedicelled, lip below, lance-linear at apex.

THE White Adder's Mouth forms an interesting link between the Bog Malaxis and the little group once called *Microstylis:* it has the former's slender spike of sessile flowers and the latter's single sheathing stem-leaf. Its name of *M. monophyllos* really belongs to a very rare and little known European orchid which carries its lip uppermost like the Bog Malaxis. Our form is a variety which Asa Gray named *M. brachypoda* (short-pedicelled) to distinguish it from *M. unifolia,* the only other member of the group known at that time to occur in our northeastern territory. It is most abundant in northern latitudes, occurring from Newfoundland and New England to Manitoba and Minnesota. Farther south in New York and Pennsylvania it is extremely rare. It flowers from June till August according to season and climate.

The plant is 3–8 in. high, smooth and pale-green; it has a single blunt-ovate leaf rather below the middle, its base loosely sheathing the stem. The spike of flowers is long and narrow, nearly half the entire length of the plant and about ¼ in. wide, the numerous whitish blossoms being set on very short stalks close to the stem. The sepals are narrow-oblong and spreading, the petals linear and reflexed; the lip is deflected, boldly widened out at the base into a rounded form and ending in a long narrow point.

This little plant has just about as good a claim as the Bog Malaxis to be called our smallest orchid. Though taller and more conspicuous in its leaf, it has a slenderer stem and smaller flowers. The perianth-parts are not so much white as colorless or faded like withered tissue. If mosquito-nymphs had crawled up out of the swamp and left their shreds of moults clinging to the stem, they would look like that. You will get a good idea of their smallness, if you reflect that there are often 30–40 flowers crowded on to 2½ inches of a spike.

Its usual home is low wet floors of wooded swamp—spots that are actually under water in the Spring, remain pretty well saturated till June or July, and never wholly dry out. It has a very great fondness for shallow depressions carpeted with flannelly green moss. We have often found it so situated in wet cedar swamps and occasionally in thickets of alder and low moist poplar belts. Not seldom it springs up in the spongy foot-paths and logging trails that penetrate our heavily wooded northern swamps.

It is easier—and safer—to say where an orchid may be looked for, than to declare positively where it won't be found. We who live in a forested region are apt to assume that the hardwoods or evergreens beneath whose shelter we find a given orchid are essential to its well-being. But it so happens that all four of us have had something of an eye-opener in regard to this very orchid. Many years ago when we had known the White Adder's

Plate 115

WHITE ADDER'S MOUTH

(*Malaxis monophyllos* var. *brachypoda*)

Plate 111

WHITE ADDER'S MOUTH

(*Malaxis monophyllos, var. brachypoda*)

Mouth just long enough to associate it with deep shade and wet mossy thickets, we happened one day to be scaling a bare rocky knoll in the region of the Lower Rideau. The hillside was full of springs that gushed out over little stony shelves and terraces; and what was our astonishment to find these shallow gravelly basins occupied by plants of *M. monophyllos!* Quite recently, too, on our trip to Gaspé in search of the Auricled Twayblade, we found on the Island of Bonaventure in a moist but open meadow a plentiful colony of it in full sunshine.

A frequent companion is Early Coral Root, and the station where we took our pictures of the White Adder's Mouth had such quantities of this Coral Root that we christened it "Trifida Bog" on the spot. It is worth describing as a typical cover for at least three of the orchids belonging to this tribe. Alongside a country road in a limestone region runs a series of undulating pastures that drop away to a shallow swamp of cedar, poplar, spruce, and tamarac. Half-way down the slope of one of these pastures are three or four large springs, bubbling and gushing out of the ground, and then hurrying down a steep bank almost side by side and straggling through the swamp.

The bank they tumble down and the strip of swamp they flounder about in are saturated through and through, and have responded nobly to this natural system of irrigation by dense cedar aisles on the slopes and a rich growth of moisture-loving trees, mainly coniferous, on the level below. The floor beneath them is full of moss-wells and basins, luxuriant with ferns, pyrolas, wild lilies-of-the-valley, sundews and orchids. At first, the Early Coral Root is almost without a rival; but in July Loesel's Liparis makes its appearance, and such a crop of White Adder's Mouth as eclipses everything else. What was "Trifida Bog" is now unmistakably and triumphantly "Monophyllos Bog."

One little find of White Adder's Mouth at least, we shall never forget. Exploring ten years ago along the "Hog's Back," near the upper waters of Pigeon River, we discovered a very

interesting stretch of spruce bog. Its borders were thick with Lady Slippers of several sorts; and we found, besides, a profusion of *Zygadenus chloranthus*, a lily we have never seen elsewhere in our neighborhood. The near end of the bog had been partly cleared and trenches cut through the peat to drain the moisture into a border stream. By way of sampling the bog we made our way over to a stand of small spruce; and here to our great astonishment and delight we found a score or more of Green Adder's Mouth (*M. unifolia*), an orchid that sent our thoughts harking back to palmy days in Eastern Ontario, for we had not seen it in twenty years.

Scrambling out at the side of the thicket nearest the road, we were just in the act of straddling one of the drains, when we caught a flying glimpse of *Malaxis monophyllos*. A projection in the wall of the ditch had been overrun with liverwort and moss; and here, if you please, some half-dozen stems of White Adder's Mouth were taking the air and moisture. What struck us as specially strange was not that these two next-of-kin should be such close neighbors; but that the very ditch which had drained the spruce thicket dry enough to support Green Adder's Mouth should use the surplus moisture to grow the White.

The wall-bracket on which they were perched proved to be a rotting old stump, soft, juicy, and green in its decay. The plants of White Adder's Mouth were quite large and disposed on the stump as if climbing about its surface; very much like a group we once photographed at Trifida Bog clustered about the base of a Silver Birch.

IV. GREEN ADDER'S MOUTH

(*Malaxis unifolia*)

NAMES: COMMON: Green Adder's Mouth, Wide Adder's Mouth, Adder's Tongue Tenderwort. SPECIFIC: *unifolia* (Michaux, 1803), "one-leafed."

PLANT: STEM: bright green, 3–9 in. high, from solid corm, with close-sheathing leaf near base. LEAF: dark green, blade ovate, spreading about midway up scape. SPIKE: short, wide raceme, 1/3–4/5 in. across, of long-pedicelled flowers distant below, crowded above to a flat top.

FLOWERS: Green, 1/6 in. long, on thread-like stalks 1/4–1/3 in. in length. SEPALS: green, lanceolate, spreading, lower pair deflected at sides of lip, 1/12 in. long. PETALS: whitish green, minute, thread-like, strongly reflexed and curled round under lateral sepals. LIP: green, 1/10 in. long, auricled at base with a pair of backward-pointing lobes; truncate at apex and three-lobed, middle lobe smaller than the lateral pair.

PLACE AND TIME: DISTRIBUTION: Newfoundland to Georgia, west to Manitoba, Wisconsin and Illinois. Also, Cuba, Jamaica, Mexico. HABITAT: bogs, woods, and hillsides; especially in resiny crumble and sandy soil. SOIL PREFERENCE: strongly acid, in marked contrast to its sister species, the White Adder's Mouth; rare in limestone regions. SEASONS: July–August, occasionally June.

SPECIAL FEATURE: Flowers long-pedicelled, lip 3-lobed at apex.

"GREEN ADDER'S MOUTH" is surely something more than a pretty fancy for this orchid: it is certainly green, and the upturned flowers at the top of the spike—very viper-heads for flatness—with their projecting sepals alongside the 3-toothed lip readily suggest the jaws of a snake with fangs exposed. It is very easily distinguished from the White Adder's Mouth by the long thread-like pedicels supporting the flowers and the short wide raceme they form. It extends farther south than the sister species, but not so far west. In many parts of its range it appears to be common where the other is rare, and to some extent it reverses the direction of its rareness. Throughout Ontario and in the Adirondacks the White is quite an abundant species while the Green is uncommon; in southern New York, on the contrary, the Green is found almost everywhere, the White hardly at all.

Plate 332

GREEN ADDER'S MOUTH

(*Malaxis unifolia*)

The stem is smooth and slender, an inch or so taller than that of the White and richer green in color; about the middle it bears a wide oval leaf, bright green, with a long closely sheathing base. The raceme of flowers is 1–3 in. long and nearly an inch wide, the slender pedicels being about ⅓ in. long. The sepals are narrow-oblong and spreading, the petals thread-like and reflexed, the wedge-shaped lip is cordate at the base, and has three lobes at the apex, the lateral pair larger than the middle one.

In the earlier stages of flowering the raceme has a very curious appearance; the upper part of the rhachis being still undeveloped, the spike shows a flattened top of short-pedicelled buds and long-pedicelled flowers, all strongly resupinate. The difference between the flower-spikes of the Green and the White Adder's Mouths is very similar to that between the Foam Flower and the Bishop's Cap. The old book-name of *ophioglossoides* for this orchid was good description, as all who know the leaf of the Adder's Tongue Fern will readily admit.

It is recorded from a great variety of stations in Canada—wet meadows in Cape Breton, "moose barrens" in New Brunswick, dry hills in Quebec, sandy plains about Central Ontario and on the north shore of Lake Superior, shady woods in Manitoba. In our experience, thickets of cedar or occasionally tamarac and spruce with a floor of dry resiny "crumble" are its favorite resort. It appears to have a decided preference for porous, rapidly drained soil. Three times we have found it under cedars along with some of the smaller Grape Ferns—the Little or the Matricary; and twice on a dry hummocky hillside along with the Adder's Tongue Fern.

Our first discovery of this curious little orchid so uncommon in our part of the world caused us such wild delight that we have never forgotten it; its name has only to be mentioned for us to get a vivid picture of the whole scene once more, though this "little affair" of the heart dates back thirty years.

It was in a big rich orchid bog of Eastern Ontario. Part of

this had been drained and was known locally as the "Huckleberry Marsh"; its whole flat peaty surface was overgrown with blueberries and other heaths; round the sides and across the middle it was trenched; at one corner of it an old wagon track led to a central stand of spruce and pine, a favorite retreat for bog-trotters when the sun stood high, a real oasis in the desert; for within its cool fragrant depths were shade, a delicious pool of spring water, a soft floor of moss and resiny needles, and the very first colonies of Stemless Lady Slippers and Creeping Rattlesnake Plantains we ever set eyes on. This alluring grove in the waste of parched heath was girdled with a broad belt of shrubbery seven or eight feet high, dense thickets mostly of American Holly.

It was just as we had struggled through this thicket of Ilex and were stooping to thrust in among the evergreens that we spied three or four dainty little spikes of an entirely strange orchid right in front of us. Just how we knew at a glance that it was an orchid, remains a bit of a mystery, but we never had a moment's doubt; and the thrill of discovery was so intense that for some minutes we just knelt and gloated, feasting thoughts and eyes on the slender stalks with their single leaf and spike of tiny yellow-green blossoms that it took a good lens to resolve into their orchid parts. From that hour it became one of our set delights in late July to make a trip to the heart of the sun-smitten Huckleberry Marsh and commune with the Green Adder's Mouth.

For twenty years we never found another station; and then suddenly in a single week-end we found two thriving colonies: one, as already mentioned, in a dry spruce thicket near the "Hog's Back"; and the other in a cedar belt of the big Cavan Bog, at the very spot where our photographer had knelt six weeks before to take a picture of the Ram's Head; the floor had pretty well dried out and with the Adder's Mouth were Green Wood Orchid, Hooded Ladies' Tresses, and Little Grape Fern, for company.

The cover must have been thoroughly typical, for after making a close study of the two stations, we went away and found three more; the nearest twenty miles away in a bog thicket already famous for its dwarf Yellow Lady Slippers; and the farthest two full days' motor-journey away from our regular beat, on a dry grassy slope in the Adirondacks.

Small and inconspicuous though the Green Adder's Mouth is, we meet it so seldom that the trim little figure with its wide raceme of flowers set on long thread-like stalks and the marvel of the tiny blossoms' structure and contrivance has come to be one of our most highly prized treasures in the summer season.

XVI

FALSE TWAYBLADE (*LIPARIS*)

1. LILY-LEAVED TWAYBLADE

(*Liparis liliifolia*)

NAMES: Common: Lily-leaved Twayblade, Mauve Sleekwort, Purple Scutcheon. Generic: *Liparis* (L. C. Richard, 1817), "fat" or "succulent" plant—"Sleekwort," in reference to the fleshy foliage; Specific: *liliifolia* (Linnæus, 1753), "lily-leaved."

PLANT: Stem: a stout fleshy scape, 4–7 in. high, smooth and angled; produced from a corm, with a pair of clasping leaves at base. Leaves: light green, smooth, glossy, keeled, ovate to elliptic, 2–4 in. long. Spike: about as long as the scape, 1 in. wide or more, forming a loose raceme of 5–27 flowers.

FLOWERS: Mauve varied with purple and green, over ½ in. long, set on half-inch crimson-purple pedicel-ovaries. Sepals: pale greenish white, lanceolate with revolute margins, ½ in. in length, upper one backward-sloping, lateral pair divergent below lip. Petals: greenish mauve or pale purple, about ½ in. long, twirled lengthwise into narrow tubes like an insect's antennæ, deflected and pointing forward under lip, often crossed near apex. Lip: mauve, purple and green; wide round-wedge-shaped (½ x ⅜ in.); clawed at base with recurrent clasping auricles; deflected forward and expanded into a wide-rounded obovate "petal"; median line raised into a greenish glassy ridge and projecting in an apical tip, flanking it a pair of rich crimson-purple veins forking and branching in little veinlets over the watery-mauve wings.

PLACE AND TIME: Distribution: New England south to Georgia and Alabama, west to Mississippi Valley. Habitat: woods and grassy slopes in light sandy soil: Soil Preference: moderate acidity, but tolerant both of strongly acid and of nearly neutral conditions. Season: June–July, rarely May.

SPECIAL FEATURE: Wedge-shaped mauve lip, purple-veined.

The Lily-leaved, like Loesel's, is a false pretender to the title of "Twayblade." Instead of being mounted midway on the stem and riding it free, as Lister's twayblades do, its pair of leaves shin up from the ground on sheathing bases. It belongs to a small group of orchids very closely akin to the Adder's

Mouths. Much larger flowers and a pair of fleshy leaves are their chief badge of distinction. Two sister species make the group, and these are seldom seen together. The Lily-leaved abounds in the south, Loesel's in the north.

The plant is short and stout but of very delicate texture, the stem easily bruised or broken, the flowers falling at a touch. The angled scape is seldom more than 2–3 in. in height and supports a wide loose raceme at least as tall as itself. The flowers are large and at near view both strange and beautiful. The pale green sepals are curled up lengthwise into little troughs and scoops; the upper convex and erect; the lower pair concave, deflected and spread, supporting the lip from beneath, their tips projecting beyond. The greenish-mauve petals are twirled into thread-like tubes, at first erect and side by side in front of the upper sepal, later deflected below the lip and often crossed.

The lip is boldly widened out into a round-wedge shape like that of the Broad-leaved Twayblade; it has the same watery translucence, but is violet-mauve in color. Its median line is raised into a greenish glassy ridge and prolonged beyond the margin into an apical point. The widespread wings appear to be fed with mauve from a pair of main arteries of crimson-purple that flank the median line and branch out over the whole surface in a network of hair-streak lines. It might almost be a little butterfly with petals for antennæ.

We do not know when we have enjoyed a day with a new orchid more than the day we first spent in the company of the Lily-leaved Liparis. Its setting was one of peculiar charm and in a district where much of the *flora* was new to us. Imagine a rolling country of drumlin and moraine where æons of genial sun have warmed the springy slopes into verdure and filled the hollows with woods and flowery meadows. In the midst of this lay a little land-locked lake sunk in a deep bowl or "basin." The glacial chill of its birth had long melted away. Water-lilies floated and dreamed on its surface, reed-beds and alders fringed

Plate 113

LILY-LEAVED TWAYBLADE

(*Liparis liliifolia*)

the margin; up the steep slopes of the basin climbed groves of oak and maple, hickory, sassafras and chestnut; while down to meet them from above came companies of hillside shrubs and upland flowers: Shadbush, Witch Hazel and New Jersey Tea; Saxifrage and Potentilla, Roses and Blue Bells; Hepatica, Columbine and Rue Anemone; Pinkster, Trailing Arbutus, and Wintergreen; Bergamot and Gerardia; Fleabane and Hawkweed; Sunflower, Golden Rod and Pearly Everlasting.

They were not all in bloom; but how much they added to one's sum of pleasure, these June glimpses of old favorites!—Hepatica and Mayflower, Oak-leaved Gerardia or the fragrant Bergamot, with their "records sweet and promises as sweet" of spring and summer months! Some of them were peculiarly welcome as rare visitors or long-lost friends; the beautiful Pinkster linked for all time in our minds with White Lady Slippers and Whorled Pogonias; the little Rue Anemone that sent our thoughts harking back over thirty years to a certain wooded bank by Scarborough Heights; and—right above us as we emerged from the oak groves half way up the bank—a bed of Blue Lupine spread out like a patch of cloud-flecked summer sky on the crest of the slope.

Not a few strangers besides met us on the way and had to be greeted before we could begin our search for the orchid. The most conspicuous of these was the Deerberry, a big shrub of the Blueberry family, much branched and with a profusion of bloom in leafy spreading racemes; its wide open bells with zig-zag rims and protruding brown anthers so much the more striking because they were all snow-white, not—as is usual—tinged with purple or green. But better still were two finds we made near the foot of the slope, golden Star Grass (*Hypoxis*) a wildwood cousin of the Amaryllis, and—biggest surprise of all—Broomrape, the one-flowered variety that sends up three or four tall and slender scapes surmounted by long tubular flowers of mauve with yellow markings in the folds of the throat.

We had hardly emerged from the oak groves before we found our first colony of Lily-leaved Liparis; it was in what proved to be a favorite situation—about half way up, where the slope was more open. We never found it where the cover was at all dense, though some of the best colonies were close to the lower edge of shrubby thickets. The soil appeared to be a light sandy loam, the surface often broken, with little patches of moss and tufts of Brittle Bladder Fern interspersed among the herbage. There were two or three flowering-spikes in the first colony, but only in bud; the presence of some seed-stalks from the year before and a number of small plants that must have been seedlings spoke well for the future; the Liparis evidently flourished and was more than holding its own. We had always supposed this orchid, in flower at least, to be extremely showy and conspicuous. But we found it quite the reverse. It was a long time before we discovered our second and third colonies and we lost them both through hurrying away at the call of the fourth. For one thing the plants stand very low, 2–4 inches as a rule, and though the flower-lip is sometimes half an inch long and almost as broad, the watery mauve of its color is quite indistinct; we found that a plant nearly 6 inches high with as many as 7 wide-open flowers melted away into thin air when we drew a step or two back from it.

In two or three hours of close search we discovered well over a dozen colonies of the orchid, and then we decided to test our sharpened senses on an adjoining slope where the plant had so far never been seen. Very soon we discovered three colonies, in one of which the plants were unusually large. Above this colony was a thicket of Deerberry and Shadbush partly overgrown with Grape Vine; and the plants themselves were actually in among young crosiers of bracken, and tufts of Brittle Bladder and Christmas Fern. The larger plants were undoubtedly older than the others; and it was here that we noticed most clearly a tendency—observable in Loesel's Liparis too—for the corms

to work up, in the course of seasons, till they stand exposed on the surface as in epiphytes. Our champion find of the day was here, growing out of a big corm whose upper half projected out of the ground; the leaves were unusually large and the fleshy angled stem was 7 inches high; on its 3½-inch rhachis were 27 flowers; 12 of these—and two days later, 17—in full bloom. We felt as we looked at this plant with its big loose raceme of delicately colored blossoms that here was surely the Lily-leaved Liparis at its best. The warm woods of the south could do no better than this.

II. LOESEL'S TWAYBLADE

(*Liparis Loeselii*)

NAMES: COMMON: Loesel's Twayblade, Olive Scutcheon, Russet-witch. SPECIFIC: *Loeselii* (Linnæus, 1753), "Loesel's."

PLANT: STEM: fairly slender, smooth, angled, 2–10 in. high; a naked scape, two-leaved at base, rising from a corm. LEAVES: pale, smooth, keeled, with clasping bases, oval to lanceolate, 2–6 in. long, erect to spreading. SPIKE: a loose, not very wide raceme of 2–12 flowers.

FLOWERS: Whitish or yellowish-green, 1/6–1/4 in. long, on pedicelled ovaries 1/5 in. high. SEPALS: yellowish green, narrow lanceolate, spreading, curled scoopwise, upper one recurved, lateral pair incurved. PETALS: linear, thread-like, rolled up into small tubes, wide-spread. LIP: yellowish green, oblong-spatulate or narrow cuneate, 3/9 x 1/8 in., ascendant at base, sharply deflexed on expanded "petal"; median line raised and prolonged into an apicle, wings concaved lengthwise and with upcurved margins.

PLACE AND TIME: DISTRIBUTION: Maritime Provinces and New England to Virginia, west to Ontario, Wisconsin, and Indiana. HABITAT: grassy or sandy boglands, damp fields and marsh borders. SOIL PREFERENCE: rather indifferent, like the Lily-leaved. SEASON: June–July or August.

SPECIAL FEATURE: Lip yellow-green, narrow wedge-shaped.

LOESEL'S Twayblade is found in Europe as well as with us. In Great Britain it is known as the Fen Orchid. In our territory it is rarely found south of New York State, and only begins to be common where the Lily-leaved ceases to flourish. It is very abundant throughout the Province of Ontario.

It is a taller, slenderer plant than its sister to the south, with longer leaves and a narrower spike. The flower is yellowish-green and inconspicuous, the lip both smaller and narrower than that of the Lily-leaved. Instead of dry wood-floors and sandy slopes, it prefers a cover of springy grassland or sedgy bog.

The spot we like best to visit for a sight of Loesel's is unique as coming at the end of a five-mile river-trail, up a winding stream and through a wooded gorge into the heart of the "Rockies." The whole region is endeared to us by a host of pleasant memories and the way that leads to it was already an old familiar trail by the time we found this piece of orchid cover so snugly tucked away among the wooded slopes.

These "Rockies" of ours lie north of Lake Ontario, and according to geologists are actually part of its ancient shore line. They got their name from the glowing account brought home by their first discoverer, a nature-lover like ourselves, in whose company we have trodden this trail many scores of times in search of wild flowers, birds, and even—tell it not in Gath!—Longhorn Beetles.

On this particular trip we had planned to swing west above the gorge and explore in a new direction. It was a beautiful day in the last week of June and a spirit of buoyancy filled the air. Even the tame approach up Gage's Creek seemed more than usually interesting. Near Ravenscourt, where our colony of Shining Ladies' Tresses grew, we flushed a small flock of Jack Snipe; and in a willow swamp, just beyond the winding reaches where our old friends the Blue Herons were busy wading after fish, we had the fun of *watching* as well as hearing a bittern boom; the "Pile-driver's" pump-handle motions, as though his long neck really were a kind of trombone, proved too much for our sense of the ludicrous; and when, made aware of our presence, he suddenly froze into the semblance of a broken stump, the camouflage was so perfect we could hardly believe our eyes.

Our eagerness to reach new ground made us hurry through the gorge to the pine wood beyond, which marked in this direc-

Plate 114

LOESEL'S TWAYBLADE

(*Liparis Loeselii*)

Plate 115

LOESEL'S TWAYBLADE

(*Liparis Loeselii*)

tion the end of our trail. We didn't even stop at "Half-way Plateau"; and perhaps our companion the bird man had his own reasons for side-stepping the spot, for he was still a little tender about that famous running broad-jump of his. A week before, elated at the discovery of a Crested Flycatcher's nest with a most unusual substitute for a snake skin in it, he had taken a flying leap at a spreading juniper; unfortunately, at the instant of his take-off, a feathered bomb exploded right under him in the shape of a hen partridge startled off her clutch of thirteen eggs. But for that, he stoutly maintains he would have cleared the bush, prickles and all.

At the head of the gorge the wood was fenced in with gnarled old pine stumps; here at the end of May we had counted half a hundred Ram's Heads under the low-branched canopy of a big white pine; now the fence corner was grown up with bracken, and orange lilies glowed among the soft green fronds. From this point we struck across a piece of upland pasture into the unknown—the woodland tract spread out just west of us below the main ridge of our Rockies.

We had given our Nature-dabblings that Spring a new and, as it proved, a most fascinating turn, by watching the various insects that visited wild flowers. A definite goal, we had always claimed, more than doubled the pleasure and profit; so out of all the many kinds of insects we chose as our special objective—Beetles; not the low-down kind, you understand; but as every kingdom has its rank as well as file, we cast eyes of favor on those unchallenged lords of Beetledom the Longhorns. Now by some strange chance it happened that almost all the favorite flowers of these sun-loving beetles were abundant about the edges of this woodland tract, and we made something like fifteen new captures in an hour or so's wandering before we clambered up the last slope to lunch under a pine.

It was while looking out pleasantly from under our canopy of murmurous fragrance that we spied in the heart of the woods

below us a most attractive bit of bogland. All that afternoon—and many another—we whiled away in this cover; for its size it was remarkably rich and varied; but of all its fourteen species of orchid, none brought us more pleasure than Loesel's Liparis. We had not yet found a station for this in the district and here it was plentiful; so plentiful that both forms of it could be studied almost side by side. Few orchid-hunters can have failed to notice how many of these plants, especially the bog-loving kinds, have an upland form as well. And we have found the Fen Orchid as interesting as any, just from this curious dimorphism.

In the firm and comparatively dry soil—grass sod mainly—on one margin of this bog we found many plants of the "upland" form; often only 2 or 3 inches high and with usually not more than 4 flowers; the leaves pretty stiffly erect and forming a sort of protective vase round the flowering stem. The plants were perfectly healthy and fruited freely; as a rule maturing rapidly—before the midsummer drought—just as plants of *Ophioglossum* and *Botrychium* do in similar conditions. Their solid corms, no doubt, make them fairly independent, secure against famine and sun-scorch.

Quite recently, while on the trail of the Alaska Orchid, we found the extreme of this upland form growing in almost dry sand on the open beach of Lake Huron; some of the plants were little more than an inch high and had but two flowers—indeed, we came on one quite healthy mite of a plant that was single-flowered! Near them were dwarfed Rose Pogonia and Grass Pink; and farther back, where it was moister but still entirely open, were clumps of enormous Rein-orchids, both Northern and Fragrant White.

In the moist, even wet and soggy, interior of our "Rocky Mountain" bog, the plant appeared in its more familiar form, just as we used to find it in earlier days about the watery winter roads of our old Lombardy Bog in Eastern Ontario, growing by preference in thinly wooded areas among sedge stems or in

grassy patches and avoiding "bush" thickets. This form is usually seven to nine inches high and of a lax habit. It flowers a week or two later than the upland form, and often multiplies into extensive colonies about wet grassy boglands; we know of several swamps in our neighborhood where you can count it by the hundred; and the upland form, too, is very generally distributed in Central Ontario. An indication of the difference in habitat between these two forms is that the Nodding Ladies' Tresses is frequently found with the upland form and Romanzoff's with the more bog-loving kind.

XVII

CALYPSO (*CALYPSO*)

CALYPSO

(*Calypso bulbosa*)

NAMES: COMMON: Calypso, Northern Calypso, Hider of the North, Fairy Slipper. GENERIC: *Calypso* (Salisbury, 1807), "Calypso," in honor of Homer's island nymph; SPECIFIC: *bulbosa* (Linnæus, 1753), "with a bulb," alluding to the biennial corms.

PLANT: STEM: a delicate scape, pale purple, 3–7 in. high; produced early in 2nd season from a biennial corm. LEAF: dark-green, solitary, long-petioled, round-ovate, 1–1½ in. long, strongly ribbed and corrugated, produced from a biennial corm late in 1st season and wintering through.

FLOWERS: rose-purple, white, and gold; large and showy, shoe-like; above —a palmate spread of 5 sepals and petals, below—a drooping sabot overcanopied by the wide winged column. SEPALS: purplish, lanceolate, over ½ in. long, nearly erect, spreading. PETALS: similar to the sepals and alternating with them. LIP: ground color whitish shading to yellow toward apex, interior crowded with reddish-brown lines of haggled streaks and arrow-barbs; overlap forming a pellucid whitish apron in front spotted with purple and bearded with 3 double rows of golden hair; the shoe about ¾ x ⅓ in., bifid at apex.

PLACE AND TIME: DISTRIBUTION: Labrador to New England in east, all the way west to Alaska, British Columbia, Oregon, and California. HABITAT: deep mossy woods, damp to dry; especially old arbor vitæ swamps in east; also under spruce and fir. SOIL PREFERENCE: slightly acid, as the humus under white cedar usually is; much more frequent a plant in limestone regions than elsewhere; on the limestone floor of the Mingan Islands (Gulf of St. Lawrence) abundant under dwarf spruce. SEASON: May–June, rarely April and July.

SPECIAL FEATURE: Flower slipper-like with overlap forming an apron in front.

THE famous Calypso, named after Homer's island nymph of Ogygia, is the most rarely beautiful of terrestrial orchids. And for all its exotic loveliness, it is a creature of the north, blooming almost before the snow melts. It was a special favorite of the great Swedish botanist Linnæus, who named it the Northern Lady Slipper. John Muir, heroic figure among our New

World naturalists, meeting it for the first time in the depths of a lonely swamp, shed tears of pure joy over its beauty. It is found in all three continents of the northern hemisphere; and with us is specially abundant on the two coasts, in parts of New England, and in northern Ontario.

In its manner of growth it is almost identical with the Crane-fly and the Putty Root, springing from a solid bulb near the surface of the ground. It begins its life cycle in late summer by producing a solitary green leaf which winters through; then in late May or early June, when the leaf begins to fade, the bulb produces an erect flowering stem, surmounted by a single blossom—"large and showy," to quote the botanies. The dark-green leaf is long-stalked, roundish in shape, strongly ribbed, and somewhat crinkly. The flower scape is purplish, sheathed below by two or three membranous leaf scales; and surmounted by an erect colored bract, from the base of which springs the flower, poised on a slender drooping pedicel.

The sepals and petals are all alike, ascending, narrow, and pointed, rose-purple with three thread-like darker lines running lengthwise through them; they are usually wavy-curled and suggest the spread fingers of an uplifted hand; below them juts out the wide-winged convex top of the column, fleshy and pale purplish-white, suspended like a canopy over the lip.

The lip is large and shaped somewhat like a low, wide, pointed shoe hung up by the heel with the opening in front, deep and roomy on the "foot" with bulging ankles, but narrowing forward into a long tapering "toe" curiously cloven into two at the tip; within, this shoe is thickly streaked, both sole and sides, with broad interrupted lines and arrow-barbs of boldly colored reddish brown, showing through on the outer side a little less distinctly.

In fashioning her shoe, Calypso has gone to work in a quite original way; unlike the Lady Slippers, she has brought the overlapping edges to the front of the orifice and folded them out

Plate 116

CALYPSO

(*Calypso bulbosa*)

instead of in. From the forward rim of the opening this "overlap" falls down in a long wide apron, concealing all but the tiny pair of toes which peep out from under its curled edge; the texture of this apron is extremely delicate and half transparent, the ground color whitish faintly tinged with rose; the upper part daintily spotted with flecks of rich purple and crested with a beard of glistening yellow hairs like spun glass.

This marvel of beauty and design is surely one of Nature's masterpieces. The extraordinary delicacy of the whole blossom, the miraculous blend of so many diversely gay colors, the structure of the lip, its multiplicity of detail and unique form, serve to create a thing of beauty unmatched in all the world of flowers.

Its chosen home is in deep, mossy woods, especially old cedar swamps; it is seldom or never found in sphagnum, nearly always in the darker green mosses, such as Mnium, so common under arbor vitæs. Frequently it is found growing in black earth among the early shoots of new spring growth, pushing up through last year's dead leaves, cedar twigs, seeds and matted rubbish, still moist from their recent load of winter snow. It does not like wet swamp cover, but rather deeply shaded situations; occasionally it is found in quite dry cedar thickets, and most of the stations recorded for it in Central and Northern Ontario are of this character.

Quite frequently colonies have been met with "marooned," as it were, in isolated places; for instance, on the top of a limestone ridge in some pockets formed by the uprooting of white pines; again, in the "Devil's Pot-holes," north of Toronto, along the course of an ancient river bed now wooded over and moss-grown; and recently an acquaintance of ours received a pailful from the Rainy River district, more than twelve of the plants having been found growing together in the hollow top of an old stump!

Like "Adam-and-Eve" (the Putty Root), Calypso disappears before the advancing tide of civilization; but while the former shrinks back to the south, Calypso flies to northern fastnesses.

There's hardly a city of to-day in New York State or Ontario in whose neighborhood this shy little beauty was not formerly found; but where the lumberman's axe once lets in daylight the woodland nymph forsakes her forest haunt.

In our own home territory we searched the woods diligently every spring for twenty-five years in the hope of finding this flower. It was only a little while ago (May 27th, 1923) that success at last crowned our efforts. While busy exploring a densely wooded swamp of old cedar and spruce, full of rotted logs and thickets of yew, right in the tracks of an old lumbering road overgrown with moss and ferns, suddenly we caught a flash of bright rose-pink as from the Gaywings or Fringed Polygala. We could hardly believe our eyes; but there it was, our quest of a quarter-century attained at last! Calypso, the enchantress of the wooded isle, arrayed in all her glory.

Our photographs were taken some years ago in a forest of Northern Vermont, where we saw Calypso growing to perfection. We can think of no fitter home for this lovely orchid than among the Green Mountains. We revisited this neighborhood no longer ago than 1926, in order to greet the new-come Spring where Calypso holds her court. The woods were still dressed in their soft and varied garb of May; tender tones of pink and yellow mingling with the soft green of deciduous trees; here and there the pale gray of a Large-toothed Aspen, or a Swamp Maple's blaze of crimson; and everywhere, the dark foil of conifers, black pointed spires of spruce, tall stands of pine, and massive hemlock groves. From all sides, as we made our way into the heart of the wood, came pleasant reminders that Spring had indeed returned, familiar sights and sounds; the loud cry of Flicker or of Crested Flycatcher, the soft note of the Mourning Dove; once in a while a cottontail loping leisurely down the trail, or a partridge drumming from a near-by thicket.

Calypso's "arbor vitæ" cover presented as varied a scene as you could meet with anywhere in the woods; tangles of elder and

Plate 117

CALYPSO

(*Calypso bulbosa*)

dogwood, spiked maple and viburnum, alternating with the evergreens beside our path; birch, balsam, pine and hemlock mingling with the gnarled old cedars. The floor of the wood was carpeted with moss; it grew everywhere, mantling the dead stumps and roots and fallen logs with green; and in the moss, flowers and ferns and trailing vines innumerable; Trilliums red and white, Crinkleroot and Star-flower, Naked Mitrewort and the delicate little Swamp Violet, white with dark eyelash markings; wreaths of Twinflower and Partridge Berry along with bushy spikes of Shining Club Moss and broad-ribboned Liverwort; Buckler Ferns —Prickly, Marginal, and Crested; Oak Fern and Maidenhair with bannerets half unfurled; crosiers of Cinnamon and Sensitive Fern.

In the actual spots where we found Calypso blooming, Goldthread was very abundant, in one or two places growing high up over the logs and stumps, its blossoms making patches of white in the green moss. It was here, too, that the Nodding Trilliums were most plentiful—and just at their best. Near by in the more open sun-warmed glades Fringed Polygala and Clintonia were about to open. Among orchid companions, besides the Early Coral Root, we were able to greet two special favorites of the Springtime—Ram's Head and Heart-leaved Twayblade.

But for us that day these glories of the awaking year were only a setting. Of Calypso itself we saw over a score of perfect blooms in this piece of cover and every indication of more in other parts of the wood. For so highly specialized a flower, it has a surprising range of variation; the average height is perhaps three or four inches, but twice we came across giants nearly seven inches high; and then the color, from deep rose-pink to the palest lavender and even white; one peculiarly beautiful plant was snow-white except for the red-brown streaks inside the shoe and the crest of gold on the "sporran." To really see Calypso you must visit her secret bower of green and meet her enthroned, as she loves to be, on some mossy dais in the shadow of the evergreens.

XVIII

CRANE-FLY (*TIPULARIA*)

CRANE-FLY

(*Tipularia discolor*)

NAMES: Common: Mottled Crane-fly, Elfin-spur. Generic: *Tipularia* (Lindley), "like a crane-fly," in reference to the straggling appearance of the long-spurred lip; Specific: *discolor* (Pursh, 1814), "mottled" (?).

PLANT: Stem: a very slender smooth scape 12–20 in. high, produced in second summer from bolster-shaped biennial corms connected in a horizontal series. Leaves: dark-green above, purple beneath, solitary, ovate, slender-petioled. Spike: a loose, elongated raceme, 1 in. or more wide, of numerous long-spurred flowers.

FLOWERS: Watery purplish green, about ½ in. across, standing out on long pedicelled ovaries. Sepals: washy greenish purple, 3 thread-lines of purple running lengthwise through a cross-pattern of suffused mauve; oblong-oval, about ¼ in. long; unsymmetrical,—tilted obliquely out of alignment in the perianth. Petals: similar to sepals in size, shape and color. Lip: watery purple with whitish median line, lance-oblong, about ⅕ in. long, bluntly hastate at base, margins revolute at middle, apex dilated and notched; extended below at base into a long slender transversely-slung spur, ⅔–⅘ in. long.

PLACE AND TIME: Distribution: New Jersey and Delaware west to Ohio and Indiana, south to Florida and the Gulf States. Habitat: rich damp wood floors in light soil. Soil Preference: strongly acid-loving. Season: July–September.

SPECIAL FEATURE: Leaf solitary, wintering through, flowers long-spurred.

This orchid owes the name of "Crane-fly" to its curious-looking blossom, the long slender spur and straggling perianth being not a little suggestive of the *Tipula* or "Daddy-long-legs." Only one other species, a native of the Himalayas, is known to occur. Our plant belongs to the southeast; and though reported from New England and New York, is very rare so far north and

Plate 118

CRANE-FLY

(*Tipularia discolor*)

Plate 119

CRANE-FLY

(*Tipularia discolor*)

probably not self-perpetuating. In its chosen home it is fairly common; about Washington it is at least locally abundant, and we found it plentiful in southern New Jersey.

Its life-history is almost identical with that of the Putty Root. From a solid tuberous bulb it produces in early autumn a single foliage leaf. This withers the following summer, before the flowering stem is thrust up. The corms are bolster-shaped, and often as many as 5 or 6 may be found in an unbroken series. The leaf is about twice as large as Calypso's and purple on the under side. The flowering stem approaches 2 feet in height. The scape is extremely slender and supports a loose raceme rather more than half its own height. The flowers, like the stem, are of a neutral shade and quite inconspicuous—watery purplish green. At close view they have a somewhat mottled appearance, due to the network of obscure little mauve veins under the surface of green. The lip is somewhat hastately lobed at the base, has its margins strongly deflexed at the middle, and ends in a dilated notched apex. The spur at its base is the most noticeable feature of the whole flower—slung transversely, very long and slender. The flower is curiously unsymmetrical, the upper sepal usually tilted to one side, instead of facing the lip, and the lateral parts obliquely opposed to each other.

It was at Cape May and late in August that we first saw the Crane-fly in bloom. The discovery of it brought to a dramatic close one of the most memorable trips we have ever had. By very skilful contriving we had managed to pack with flowering orchids the whole ten-day space as tight as a box of sardines. But to find the Crane-fly in bloom in the same week as the Giant Ladies' Tresses was bringing July and September together in the middle of August.

At the very outset our eager inquiries about the Crane-fly had been met with the news that its flowering season was long past and the only good station, a beautiful oak wood of virgin timber, had just perished beneath the axe. We were taken to the place—a

charnel-house of dead limbs and bleeding stumps unsightly with rank weeds; our guide actually pointed out the very spot where under giant oaks in a bed of trailing Partridge Berry a big colony of Crane-fly had flourished; and there, sadly, in sawdust and sow-thistles we buried our hopes.

And then on the last day of our trip, we were joined by a brother man-of-grass and coaxed into staying an extra day. If we showed him the Yellow Fringeless Orchid, he'd help us stage a glorious last big drive for the Crane-fly and the Autumn Coral Root.

We decided to go first to a strip of wood still uncut near where the big colony of Crane-fly had once been. Nothing had ever been found there, we were told; but it was certainly part of the same stand of timber, and on approaching it through the graveyard of its fellow trees and noticing its fine groves of oak, we hastily disinterred our buried hopes. And, sure enough, we had hardly crossed its borders before one of us (the greenhorn as usual) found a seed-stalk of what looked like a very tall slim Coral Root. A single glance and the expert pronounced it *Tipularia!*

As soon as we knew what it looked like, we began to find its seed-stalks all about us, slender almost to invisibility except for the ovaries dangling like grains of oats about the top eight inches of the two-foot knitting-needles of scapes. At least one hundred plants were scattered about between the Sour Gums of the damp hollows and the drier oak-stands. But alas! their season was long past. We scoured the whole area carefully over, and at last were forced to abandon the quest for blossoms as hopeless. Our discovery, in the last little nook still left to explore, of three plants with shreds of withered petals still clinging to the ovaries, only made our disappointment all the keener; ten days earlier these Crane-flies must have been still alive and erect on their perch with wings outspread.

The other string to our bow, the Autumn Coral Root, had yet to be tried. Lunch could wait, so off we set to the only station

known for it in the neighborhood. It proved to be a very similar wood but richer, with Holly, Hawthorn, Liquidambar, and other trees interspersed. Its floor was quite the most interesting we had seen in the district, with plenty of Spotted Wintergreen and Partridge Berry as well as colonies of Pink Moccasin. And when we found a bed of Narrow-leaved Chain Fern and beyond it a beautiful oak grove with luxuriant colonies of Downy Rattlesnake Plantain scattered about, we forthwith settled down to hearty enjoyment of New Jersey woodlands in August.

Suddenly, from the photographer, came a shout of "*Tipularia* in bloom!" Exploring the slopes of the damp trough where *Woodwardia areolata* grew, he had scrambled up to a slightly raised plateau and found a big flowering stem of Crane-fly staring him in the face. For five minutes we went completely crazy, and then, carefully marking the fateful half-inch of woodland, drove hastily back to headquarters. Here two of the party were impatiently awaiting our return to lunch. Hard as we tried to enter the public dining-room with stoic calm, it wouldn't do; and the uproar at our little table, when the news leaked out, made the whole room stare aghast; even the darky waiters were scandalized.

Lunch barely over, we raced back to the scene with plant presses, backgrounds, reflecting mirrors, and other first aids to the camera; for if ever woodland creature knew how to fade into thin air, it was *Tipularia* in full bloom. While the photographer was busy coaxing the elusive Crane-fly out of its own shadow, the rest of us spread about in a final search for Autumn Coral Root. Not a trace could we find, though our combing of the woods was close enough to create a new record for the county in the shape of the Spotted Coral Root. After more than an hour's hunt, we returned to gloat over the Crane-fly, empty-handed and with nothing to show for our pains. Nothing just then, that is; but it appeared next day that all unconsciously we had in fact been very active collectors the whole afternoon. Among us, we could prob-

ably have made up one of the finest series of "jiggers" in the whole State of New Jersey.

Finding the photographer still hard at it when we returned from our search for *Corallorrhiza odontorhiza*, we amused ourselves trying to spot seed-stalks of *Tipularia* in the shadows of the wood. In spite of their standing at least knee-high, they were almost invisible; but such is practice that we soon found the plants fairly numerous. Presently a cry of glee announced more *Tipularia* in bloom, this time two plants close together; but so uncannily would they disappear that some one had to mount guard over them for fear of losing the station. The photographer was hastily summoned, and on the way nearly stepped on a second pair in full bloom. By the time we had all gathered to the spot, some ten plants in perfect condition had been discovered.

It was for all the world like witchcraft. They seemed to spring into being before us. But the man who put the crowning cap on this piece of wood magic was the professional botanist. In order to examine the second pair of flowering spikes more closely, he leaned his plant-press up against a neighboring tree. When he turned round to pick it up again, there—in actual contact with it—stood a plant of *Tipularia* 2 feet high, with over 30 flowers ranged in a spike 8 inches long and more than an inch wide.

These late-flowering plants were all growing about a slightly raised plateau, decidedly drier than the surrounding groves. In these the Crane-fly was perhaps equally abundant, but it had all flowered a month earlier. It looked as though the exceptional drought of July had checked the growth of the orchid on the dryer levels, and then the heavy rains of early August had given the plants a sudden impetus, a new lease of life, enabling them to complete their cycle that season.

XIX

PUTTY ROOT (*APLECTRUM*)

PUTTY ROOT

(*Aplectrum hyemale*)

NAMES: Common: Winter-leaf Putty Root, Adam-and-Eve. Generic: *Aplectrum* (Nuttall, 1818), "Spurless," probably in contrast with its next-of-kin, the Crane-fly Orchid; Specific: *hyemale* (Muhlenberg, 1805), "winter," from the leaf staying green from Autumn to Spring.

PLANT: Stem: a bare smooth scape, greenish to olive, pale below, 10–16 in. high; produced early in 2nd season from a globose biennial corm. Leaf: dark green, strongly nerved, petioled; large, long-oval, solitary, produced from the corm late in first season and withering early next summer at the flowering season. Scape: a loose raceme, 1 in. or more wide, of 8–15 flowers standing out on half-inch pedicelled ovaries.

FLOWERS: Pale purplish green or yellowish with white lip sparingly marked with mauve; about ½ in. long and nearly as wide. Sepals: pale purplish green, rimmed round the tips with dull mauve-brown, spreading; lateral pair somewhat falcate-curved; lance-oblong, about ½ in. in length. Petals: pale green, tipped with dull purple, slightly shorter and wider than sepals, somewhat arched forward over the column. Lip: white marked with pale purple or mauve; ⅜–⅖ in. long, ⅑ in. wide; 3-lobed, somewhat hastate, basal lobes separated at their outer or upper end by diagonal slits on margin; main body of lip carried forward into a large apical lobe with upturned margins, crinkly-edged or scalloped, crested on face with three longitudinal ridges.

PLACE AND TIME: Distribution: New England south to Carolina, west to Saskatchewan, Minnesota, and Kentucky. Habitat: rich deciduous woods of first growth timber. Soil Preference: neutral, tolerant of slight acidity, but flowering only in favorable conditions. Season: May–June.

SPECIAL FEATURE: Plant with a single large leaf that winters through, and a loose spike of spurless flowers.

The Putty Root unlike Calypso is peculiar to our continent. It makes its home in moderately rich woods of deciduous trees; and in the days of our grandparents, before axe and saw had let too many windows into the hardwood forests, "Putties" were

much more abundant. Children used to dig up the corms for their sweetish taste, and the glutinous juice was a household remedy for broken china. It has been recorded as far northwest as the Saskatchewan River Valley, and it is still found sparingly throughout Ontario; but it is much more abundant farther south, ranging from between Vermont and Georgia in the east to west of the Mississippi Valley.

The corms from which the plant is produced are large and globular, often an inch in diameter; a new corm is formed each year, attached by a fleshy ligament to its parent; as the corms live on for two or three years, usually a pair—sometimes three—of these big solid bulbs are found fastened together horizontally; hence the quaint old name of "Adam-and-Eve."

Late in summer the corm produces a large narrow oval leaf nearly 6 inches long; it is dark bluish-green and strongly ribbed or plaited. The flowering stem, which is thrust up quite rapidly at the end of the following May, is smooth and stout, with two or three sheathing scales upon it; it is pale grayish below, light green above, and rises to a height of well over a foot. It is surmounted by a loose spike of short-pedicelled spurless flowers that stand out on their ovaries almost at right angles to the stem.

The flowers have a spread of half an inch—just the same as the length of their perianth parts. The sepals and petals are oblanceolate or narrow spatulate in shape, and pale green or purplish green on the basal part tipped with dull mauve brown. The sepals are spreading, and the lateral petals project side by side over the column and lip. The lip is white or very pale cream, with violet markings on the side and at the apex. It is three-lobed and scoop-shaped, being obliquely cleft at the sides below the middle and having the lateral pair of lobes turned up; the middle lobe or outer half of the lip is somewhat dilated and crimped or wavy-curled on its upturned margins. The floor of the lip is thickened on the median line by a flattened ridge flanked on each side by a low thin fleshy crest.

Plate 120

PUTTY ROOT

(*Aplectrum hyemale*)

Plate 111

PUTTY ROOT

(*Aplectrum hyemale*)

The plant is usually found in moderately rich woods of deciduous trees. Judging from the three or four stations at which we have seen it growing, it has a preference for the rich leaf-mould of beech and maple groves. A fairly open clean floor near the lower end of a gentle slope, where the ground is damp rather than wet,—such would be a likely spot to find it in. Occasionally we have found colonies low down near the edge of a wet trough, or quite high up on plateaus at the top of a slope with a fairly heavy underbrush of seedlings; in both these situations the plants bloomed seldom and noticeably later.

Except under almost ideal conditions it is anything but free-flowering. Some seasons, in a wood where there are many plants, hardly one scape will be found, nothing but the long dark-green leaves to bear witness to the strange underground life of the Putties. Occasionally, the plant gets as far as throwing up its scape and producing a spike of buds that never open.

One of the "great moments" we four look back to in orchid-hunting was our visit to a rich and extensive wood of mixed trees which harbors many of these plants. It is an old wood of second growth where fortunately little cutting has been done in recent years. In early days it contained a magnificent growth of white pine, and these are still a conspicuous feature; but to our mind the trees that give it distinction, even more than its maple and pine, are hemlock and beech. We have never wandered through a wood where the dark hemlock groves and sun-chequered "beechen aisles" were more beautiful.

The tract in which we found the Putty Root most abundant was a fairly open space—a glade rather than a grove—of beech, maple, basswood, butternut, ash, and occasional white pine; the floor was slightly tilted, clean, leafy and rich. Among the common spring flowers that we noticed were Trilliums, Indian Cucumber, Hepatica, Foam-flower, Wintergreen, Large-flowered Geranium, Star-flower, Baneberry and Mandrake; more interesting, because less usual to us, were large trees of Flowering Dogwood and an

abundance of Rue Anemone. The rich mould was evidently attractive to some of the ferns, too; besides Virginia Rattlesnake, Prickly and Christmas Fern, we noticed at several points young fronds of Cinnamon, and most beautiful of all, Maidenhair and Broad Beech Fern.

We entered the wood by an old wagon trail, but soon left this for a winding footpath that led us most enchantingly into the very richest groves of all. The plants were growing a little way in from the path, several colonies covering a fairly wide area, but all near the foot of the slope. Within a few rods of them were four other species of orchid—Yellow and Stemless Lady Slippers, Showy Orchis and Hooker's; the two last abundant in every part of the wood that we visited.

In spite of the large size of the Putty Root stems and racemes, they proved very hard to detect owing to their neutral color, which enabled them to melt into the shadows of their background. For some minutes, indeed, we were dreadfully afraid, as had happened before, that there were no blossoming spikes at all. But as soon as the first stem was detected, we were able to get their focus, and presently a little colony was revealed.

As in searching for Listeras, the best plan is to stand still at every yard or two and let the eye slowly quarter the ground this way and that from almost one's very "stance." For some objects, large rather than dense, and entirely neutral in color, the eye must be riveted for some seconds on the same spot before their outline grows distinct and prints itself on the retina.

XX

CORAL ROOT (*CORALLORRHIZA*)

I. EARLY CORAL ROOT

(*Corallorrhiza trifida*)

NAMES: COMMON: Early Northern Coral Root, Pale Coral Root. GENERIC: *Corallorrhiza* (Haller; R. Brown, 1813), "Coral Root"; SPECIFIC: *trifida* (Chatelain, 1760), "split into three," of the 3-lobed lip.

PLANT: SCAPE: pale yellowish green, 3–11 in. high, smooth; with a cluster of short, underground, fleshy, brittle stems, resembling coral. LEAVES: 2–5 pale sheathing scales. SPIKE: 1–3 in. long, forming a loose raceme of 10–15 flowers.

FLOWERS: Pale yellowish or greenish on green ovaries. SEPALS: greenish-yellow, lateral pair somewhat spreading and deflected at sides of lip, lance-linear or narrow oblong, concaved, ¼ in. long. PETALS: similar, but shorter, contiguous, roofing over column. LIP: white, often spotted with purple; broad-oblong, 1/6–1/7 in. in length, narrowed almost to a claw at base; slit below middle into a pair of basal lobes, lateral margins turned up, apical half deflexed and wavy-edged, with a cuneate flattened crest on face.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England to New Jersey in east, west to Alaska, British Columbia, Washington and Oregon. HABITAT: wet woods and swamp cover, especially poplar, cedar, and spruce. SOIL PREFERENCE: relatively indifferent, thrives in strongly acid humus, also observed in neutral limy matter. SEASON: May–July or August.

SPECIAL FEATURE: Small, stem yellowish, lip truncate at tip.

THIS is one of our commonest Coral Roots, and most outdoor folk are likely to be familiar with it; the more so, that it appears in May when the wild flowers call us loudest to the woods. Its household name in our part of the world hits it off much better than the books; neither *innata* nor *trifida* has any special point; whereas "early" serves happily enough, from east of New England to west of the Great Lakes, to distinguish this Coral Root

from the Large-flowered of later summer, the only other kind common in the region. It is found throughout the northern hemisphere: across Eurasia from Scotland to Manchuria; and in the New World from the Pacific to the Atlantic ranging in the east from Arctic Canada to New Jersey.

The plant is slender and pale greenish-yellow; this tinge of green, a color-badge forbidden to most saprophytes, displays itself on every part—stem, rhachis, flowers—but most of all on the ovaries. The flowers number 3–12, arranged in a loose spike, pale yellowish with white lips often spotted with purple. The sepals are somewhat spreading, longer and narrower than the petals, which are hooded together over the column. The lip is broad-oblong and divided into three lobes by a pair of oblique slits at the side. The basal lobes are turned up into lateral walls and the floor between is prolonged into a truncate apical lobe slightly rimmed on the margins and with three fleshy ridges in the centre.

So small a flower needs to be looked at closely or it will not yield the secrets of its beauty: under the lens this tiny petal of an orchid lip is a perfect marvel of curious carving and color design. The absence of purple spots is relied on by some to distinguish this plant from the little Autumn Coral Root (*Corallorrhiza odontorhiza*); but in the course of a very wide experience we have found the lip almost as often spotted as unspotted.

In the region of the Great Lakes this orchid occurs in most low wet woods; both deciduous and evergreen. The first time we ever saw it was in a dense tangle of willow, alder, and poplar. We were not looking for it, and hadn't the least idea at first what it was. In point of fact we had just flushed a woodcock which shot up through the trees with the erratic whistling flight peculiar to it; and where we thought to find perhaps its nest of eggs, we saw only its drill-holes and two or three scattered colonies of this strange little saprophyte with coralline "root"-clusters. It makes its home in quite a variety of places; we have even found it, like Indian Pipe, growing in sphagnum moss. As a rule it will be found in

dead leaves or decaying vegetable fibre, particularly about the bare wet floors of cedar thickets.

Curiously enough our second station for it, found soon after we moved into central Ontario, is also memorable as the scene of a bird encounter. It was a low moist strip of wooded river-bank at the head of a mill-pond. And one season a spring freshet carried away the dam and converted the head of the pond into a Nile delta of rich alluvial mud. Going out early one Saturday morning —fortunately with field glasses—to see if any of the little fleshy spikes of Coral Root were in sight yet, we suddenly put up a flock of Black-bellied Plover from a sand-bar, and discovered that the whole delta was alive with shore-birds and waders evidently making for their Arctic breeding-grounds and resting momentarily from the great migration flight at this tempting half-way house.

Most of the birds were small, the one notable exception being a flock of Golden Plover. It was very interesting to watch them from behind our screen of willows; all showed that curious "teetering" fore and aft, the frequent bobbing of head and neck and flirting of tail to which one of them owes its popular name; but prettiest of all was to see their quick clean step and dainty tread about the little sand-bars and mud-flats that made the shores of their Liliputian lakes. Several of them were easily identified—the Least Sandpiper, the Solitary, the Spotted, and the Red-backed or "Black-heart," as the local gunners call it from the disk of jet on its belly. The most exquisite of them all was a little white-throated, white-breasted, white-bellied bird with dusky head, black collar, and gray-brown back and wings; it looked like a dwarf "Kildeer," and proved to be the Semi-palmated Plover, a most beautiful bird and surprisingly tame.

In the neighborhood of Peterborough the Early Coral Root, as we soon discovered, is extraordinarily abundant. Our very first spring in the new district, going eagerly out to follow up traces of Ram's Head noticed the autumn before, we came on a remarkable sight. There were our Ram's Heads sure enough, dainty little

Plate 1.2

EARLY CORAL ROOT

(*Corallorrhiza trifida*)

groups at the base of some tamaracs; but all about the low wet straggling thickets of tamarac and cedar, covering an acre or more of ground on the margin of a big peat bog, stood thronging colonies of this pale-yellow saprophyte. It has a special liking for the floors of wooded swamps that have been partly drained; and where it once finds suitable cover, it spreads in astonishing abundance.

Our favorite spot for it is "Trifida Bog," a snug little moss-floored grove described in our chapter on the White Adder's Mouth. Here it grows not only in immense quantities but in most luxuriant form. In Great Britain, where it is extremely rare, it is said to reach a foot in height. The New World form, thrifty and abundant from coast to coast, we have every reason to believe is just as well-favored. Three or four times in Trifida Bog we have found plants 12 inches in height and carrying 13–15 flowers in their spike, and once we came on a monster with 12 blossoms that stood 11 inches high and measured three-fifths of an inch round the base of the scape.

Lying within a few rods of a good motor road, this orchid sanctuary is always easy of reach. We have found it, besides, a perfectly safe retreat; so much so that more than once we have used it as a nursery for some orchid rarity whose life history we were anxious to trace. Naturally, between spring and fall, we may often be seen wending our way down the little lane toward Trifida Bog; and the farmer at work in the fields has a fixed idea, which we would not for worlds disturb, that we are heading for the limestone springs that gush out of the slope behind his barn.

Only last fall, having just returned from a three-months' trip in Great Britain, we hurried eagerly out to hob-nob for an hour with old acquaintance in our sanctuary. As we emerged from the lane at the end of our visit we were met by the farmer, who at once began to dilate on the virtues of his limestone spring. We'd be surprised, he said, at the number of cars that stopped on the road here. Why, only that summer, back in June, he had met two

parties who told him they had driven all the way from Buffalo to taste that water.

And then, later on in the fall, when our partners came over to hear our story of finding *Habenaria albida* at the foot of the Grampians, their curiosity was greatly piqued to know by what Highland gift of second sight in far Glen Lochay we had sensed their stolen trip to Trifida Bog. They had been there twice, and had seen such a crop of Early Coral Root as never before. It had been at the height of its flowering season when they visited the grove the third week of June; and actually on their second trip, some five weeks later, they had seen two or three spikes still in flower among the colonies of White Adder's Mouth. Like all our northern Coral Roots it has a long season. We have sometimes found it in flower as early as the third week of May; and in 1926, while exploring a cold spruce bog in the region of Thunder Cape, we came upon a perfect flowering spike on August the 3d.

II. SPOTTED CORAL ROOT

(*Corallorrhiza maculata*)

NAMES: COMMON: Spotted Coral Root, Large Coral Root, Many-flowered Coral Root. SPECIFIC: *maculata* (Rafinesque, 1817), "spotted," of the lip.

PLANT: SCAPE: pale pinkish purple or magenta sheathed with whitish scales, 8–16 in., or rarely 19 in., high. LEAVES: reduced to sheaths and scaly bracts devoid of green. SPIKE: a loose raceme of 10–40 flowers, 3–7 in. long.

FLOWERS: Purple and white, somewhat spreading, ½–¾ in. long, on purple ovary-pedicels. SEPALS: pale greenish yellow rimmed with dull purple; lanceolate, ⅓–⅖ in. long; lateral pair spreading, curved-falcate. PETALS: whitish, with purple spots near base, oblong with blunt tips, slightly shorter than sepals, connivent with upper sepal in a loose canopy. LIP: white with dark spots on margin and large purple blotches on face; ¼ in. long, hastately lobed near base by a pair of lateral clefts; broad oblong to quadrate above, but rounded toward apex, slightly rimmed and tapering, so as to appear ovate.

PLACE AND TIME: DISTRIBUTION: Newfoundland and New England south to Virginia and Carolina, west to British Columbia, Oregon, and California. HABITAT: dry leafy wood-floors. SOIL PREFERENCE: moderate acidity, but tolerant of varying conditions. SEASON: June–September.

SPECIAL FEATURE: Large; lip hastately 3-lobed; middle lobe somewhat quadrate and blunt-pointed.

THE Large or Spotted Coral Root is almost as abundant as the Early, but its colonies are loose and scattered instead of crowded and dense. It is not known outside the New World, but has with us a very extensive range—all across the continent in a broad band between Newfoundland and North Carolina in the east, British Columbia and California in the west.

Judged by the shape and color of the lip, the Spotted is nearer of kin to the Early than to any other of our Coral Roots. It is a tall stout plant, often well over a foot in height. The stem is purple, clothed below with 2 or 3 sheathing leaf-scales and surmounted by a loose spike of 10–30 flowers. These are nearly ½ in. long; the sepals lanceolate, the petals oblong, all five pale yellowish tinged on the back and edges with dull purple, and the petals marked with madder near the base. The lip is pure white, spotted with rich purple; it is three-lobed and somewhat broad-oblong; the upturned basal lobes are separated by clefts rather than slits from the large middle lobe, which is rimmed on the margins and crested down the middle with a pair of flattened fleshy ridges.

The plant varies a great deal in coloring, the purple tinge being sometimes very pronounced, and again quite faint; indeed, albinos are often found of a pale yellowish white, in which the purple pigment is entirely lacking. It has one feature which is quite unique among the Coral Roots—the knob near the top of the ovary-face, which marks the point of union of the lower sepals with the lip, is developed into a good-sized spur decurrent and adnate.

The first time we ever saw this curious saprophyte with its lurid-looking stem and stiff spike of pale drooping blossoms was on a densely wooded island in one of our northern lakes. We have never forgotten that day of August many years ago, for it brought us our first meeting with a whole handful of entirely new

plants: on the cliffs and wooded slopes of the north shore, Canada Sumac, Steeplebush, Rusty Woodsia, and Ebony Spleenwort with its beautiful green pinnate fronds set on dark shining stalks; then, on "Sand Island," big clumps of Indian Pipe standing ghostly white alongside the purple stems and spotted flowers of Large Coral Root.

It grows by preference in dry woods, both deciduous and evergreen; it is probably most often noticed in open mixed woods, but it has a great fondness for the dry resiny crumble that carpets the floor of a pine grove. We have occasionally found it in boglands, but only on the wooded "islands" raised above swamp level and well-drained. Even where it shares quarters with the Early Coral Root, it shows its preference for dry situations by developing later; for in our climate woods that are quite moist in May and June are bone-dry by August. A wood-floor with its undulating surface and varying conditions of drainage has no uniform rate of drying out, and that probably explains why the Spotted Coral Root crops up so irregularly at most of its stations; any day in August you will find in the same wood spikes just breaking through the ground while others are full-grown—in bud, in flower, and in seed.

Until quite recently all four of us, we found on comparing notes, had a fixed idea that in our territory at least the Spotted Coral Root never appeared before August. But twice in the last five years we have had a rude awakening and been forced to sit down to a diet of humble pie. The first shock came in 1924 when we discovered a large clump of these plants in full bloom on July 1st. They were of a pale yellow color and growing under white pines in a loose mat of dead needles, twigs and cone-scales. An hour's search in the same vicinity yielded two more groups of flowering plants, all of the same pale form and similarly situated.

That same afternoon we visited a mixed wood some five miles distant in which we had noticed seed stalks of this orchid the previous fall. Here again we found a large number of plants in

flower; they were nearly all in two distinct areas: a dry flat leafy floor under beech and maple; and an elevated plateau much more thickly wooded and containing a large proportion of hemlock and pine. In the first of these places, the plants were nearly all of normal purple color, but on the plateau fifty per cent were albino. One of these pale clumps was so unusual that we cannot forbear recording it. There were eight plants in the group; two of these had a stem-circumference at the base of 7/8 inch, reached a height respectively of 16 in. and 17 in., and carried one of them 28, the other 33 flowers. A third was larger than any plant of this species we have ever seen or heard of: it stood 19 in. high, had a stem-girth of 1½ in. at the base, and carried a 7-in. spike of 38 flowers; all but two of these secured fertilization and ripened their seed-pods.

In general this wood was a thoroughly typical "*maculata*" cover; fairly dry and quite rich in saprophytes like Indian Pipe, Pine Sap, and Beech-drops; we also noticed a few plants of Hooker's and several colonies of Downy Rattlesnake Plantain. One thing that particularly struck us here was a point the photographer first drew our attention to—the fondness this Coral Root often shows for a steep slope. On three sides the plateau fell away in precipitous banks, and all three of these banks had plants of Spotted Coral Root growing near the top. The camera man has been heard to maintain stoutly that this orchid has a special "pick" against him and that the best plants invariably uprear themselves on inaccessible slopes.

The final blow to our "Augustan Theory" was dealt in 1925 when we found, on the shores of "Clear Lake," a wood with all three of our native Coral Roots—the Early, the Spotted, and the Striped—in full flower together within a few feet of one another on June 13th. The spot where we met this unusual sight was on the edge of a damp thicket of hemlock and cedar which proved to be a regular "Cave of Adullam" for its strange fellowship of orchids—*Habenaria hyperborea*, *H. obtusata*, *H. orbiculata*, *Epi-*

Plate 123

SPOTTED CORAL ROOT

(*Corallorrhiza maculata*)

pactis ophioides, *Ep. tesselata*, *Microstylis monophyllos*. The Rattlesnake Plantains were small and not very sturdy, but all the others, including the three Coral Roots, appeared robust.

That these early flowerings of the Spotted Coral Root were not in the nature of a freak was proved by the performance being repeated in even so backward a season as 1926. The wood where we saw the very large plants blooming on July 1st has been under observation now for five successive years, and flowering plants have been found there in abundance each season from the end of June till the first week of September.

III. WISTER'S CORAL ROOT

(*Corallorrhiza Wisteriana*)

NAMES: COMMON: Wister's Coral Root, Southern Coral Root, Early Southern Coral Root. SPECIFIC: *Wisteriana* (Conrad, 1829), "Wister's."

PLANT: SCAPE: pale purple below, reddish above; 6–16 in. high, stout at base but not bulbous-thickened, upper part and rhachis much slenderer. LEAVES: reduced to sheathing scales, whitish to pale purple, striated. SPIKE: a loose raceme of 12–16 flowers, 1½–2¼ in. long, 1–1¼ in. wide.

FLOWERS: Reddish-brown, purple and white; about ⅓ in. long, in two halves, sepals and petals above like 5 slightly spread curving fingers of a hand, lip below and deflected forward of base. SEPALS: greenish yellow tinged with brown-purple and marked with linear flecks; lance-linear, about ⅓ in. long; lateral pair curving or slightly falcate. PETALS: paler, but similarly marked with dull flecks, lance-ovate, ¼ in. long. LIP: white with dotted rows of purple round margin and on median line; roundish, ⅓ in. long, broad-clawed at base, dilated above and deflected in a roundish petal, sides notched at middle and rimmed, apex marked by a cleft fold.

PLACE AND TIME: DISTRIBUTION: Maryland and Indiana to Gulf States; reported from Pennsylvania. HABITAT: damp wood floors and ravine slopes. SOIL PREFERENCE: neutral, rarely found in acid conditions. SEASON: February–May.

SPECIAL FEATURE: Lip wide-rounded, clawed at base, notched at apex.

WISTER'S is the Spring Coral Root of the South. It flowers as early as February in the Gulf States; and even about Washington, at the north end of its range, we have seen it in blossom the last week of April. It was for many years confused with the

Plate 114

WISTER'S CORAL ROOT

(*Corallorrhiza Wisteriana*)

Small Coral Root (*odontorhiza*), an autumn-flowering kind of very similar appearance, but much smaller and with a more northerly range.

The plant is usually from 8 or 10 inches to over a foot in height. The stem is fairly stout, but not bulbous-thickened at the base like that of *Corallorrhiza odontorhiza;* it is dull purple-reddish above, paler below—and sheathed to well above the middle with striated scale-leaves. The spike of flowers surmounting the scape is loose and fairly wide—about 2 in. long as a rule and rather more than an inch across, the greenish-brown ovaries being thrust out horizontally from erect pedicels. The flowers are about 1/3 in. in length: the sepals and petals side by side above and slightly drooped over the column like the fingers of a hand hollowed and inverted; the lip horizontal below in the form of a broad clawed base, deflected above and expanded into a single, roundish, rimmed "petal," without lobes, though its lateral edges show a few crenulate notches or teeth at the middle, and the apex is folded and cleft. The sepals and petals are all yellow-green and marked with linear flecks of dull purple; the lip is white with spots of rich violet, running in dotted rows, single or double, round the margin and up and down the middle.

Though this is a small-flowered Coral Root as compared with the Spotted and the Striped, the lips are exceedingly pretty. They have the clean-washed look of little shells or delicate bits of porcelain, scallop-rimmed and "vermeil-tinct." The plant prefers open situations to thickets, the lower reaches of slopes and river banks lightly shaded with deciduous trees; its early maturing would seem to show that it is more dependent on moisture in the soil than most of the Coral Roots.

A hurried trip to Washington late one April gave us our first sight of Wister's. It was a most delightful experience, to rush at a few hours' notice from a belated spring into midsummer. In a moment, all about us thronged the old familiar things—flowers, insects, and birds—with every now and then the surprise of some-

thing new and strange in bird-call or blossom. Long before dawn we could hear a Mourning Dove croon, and with the sun rose the song of a Southern Mocker; both birds having nests in the garden within sight of our windows.

Our first venture was down into a deep ravine on the outskirts of the city. It was beautifully wooded, and the trees had already donned their summer green. Close beside our path at the top of the slope, we were shown where Beck's Ladies' Tresses had been found the autumn before, and a little farther down we saw Whorled Pogonia just breaking through the ground. No sooner had we reached the bottom than we found ourselves close beside a picturesque little stream, its banks all decked with Bluets and Trailing Arbutus. It was no great distance from here to the upper end of the ravine, where our Coral Root had its station, but the whole way was crowded with discoveries. Old friends, like the Black-and-White Warblers, Veeries, and Towhees, were on every side; Cardinals and Mocking Birds filled the valley with music, and twice from the ridge above us came the call of a Bob White. We met, besides, three interesting strangers—the Water Thrush, the Tufted Tit, and the Carolina Wren with its beautiful flute notes.

Just where our stream came tumbling out of a steep little gorge, we were led a few yards up the bank to have our first sight of the new orchid. The slope was lightly wooded with Oak, Hickory, and occasional pine; to our northern eyes it looked decidedly rich. There was a great variety of spring Flowers—Saxifrage, Wild Ginger, Bloodroot, Rue Anemone, Spring Beauty, Bishop's Cap, Indian Cucumber, Toothwort; rarer sights to us were Spicebush, Lyre-leaved Salvia, Spiderwort, Squaw-root, and the quaint little *Obolaria*, or Pennywort, an entirely new plant on our list, Maidenhair and Virginia Rattlesnake were the predominant ferns. Close beside the Coral Root we found Chamaelirium or Blazing Star, the Showy Orchis almost ready to flower, and some rosettes of Downy Rattlesnake Plantain.

It needed no more than a glance to tell us we were too early

for Wister's by nearly a fortnight; the little spearheads were only just breaking through the ground. So a few days later we carried our quest into Virginia, along the Potomac near the Great Falls.

We shall never forget that April afternoon: perfect summer weather, a noble river scene, wild flowers in profusion, and time to take it all in on a brand-new orchid trail—what more could heart desire? The wooded plateau at the head of the great gorge engrossed us first; rocks ablaze with Moss Pink, honey-scented like Sweet Alyssum, and winding paths of surprise; here we found Early Saxifrage, Stonecrop, and Pennsylvania Campion, "Scotch Maidenhair" and Ebony Spleenwort; the delicate little Five-leaved Anemone and the Sessile Trillium—a dwarf with purplish-green flower and mottled leaves. Above the falls the curve of the valley was filled with Red-bud—an astonishing sight, and our path among the river-flats was beset with new wonders, Butterfly Violets and the exquisite little Rafinesque's, Virginia Lungwort, Yellow Corydalis, Ivy-leaved Speedwell, and *Alliaria*—an onion-scented Crucifer.

Just where the river comes cranking in toward the cliff and the river flats are replaced by hardwoods with alluvial wash on the floor, we came upon our first plants of Wister's Coral Root, some of them growing right in the pathway. A curiously shaped rock standing out a little off-shore serves as an excellent mark for the orchid. Indirectly, as the story goes, it also led to their first discovery.

A boatload of people, crossing over to explore an island in mid-channel, found the current too strong; so turning their boat, they headed it toward this rock and brought it to land at the adjoining bank. No sooner had they scrambled ashore than they found themselves face to face with hundreds of plants of a strange orchid in full flower; it proved to be Wister's Coral Root.

The first plants we saw were mere spear-points like those we had found in the wooded ravine; but presently we came to a more open space where the plants were already half grown, especially a

group of five with budding spikes unfurled. Three days later they had doubled their height, and the lower half of the spike was in open flower. It was nip and tuck, a closer thing even than the "Three Birds" down in New Hampshire. But it certainly added spice to the trip. Seldom has a new orchid flowering before us for the first time brought keener pleasure than Wister's Coral Root on the banks of the Potomac.

IV. AUTUMN CORAL ROOT

(*Corallorrhiza odontorhiza*)

NAMES: COMMON: Autumn Coral Root, Late Coral Root, Small Coral Root. SPECIFIC: *odontorhiza* (Willdenow, 1805; Nuttall, 1818), "tooth-rooted."

PLANT: SCAPE: pale purple to brownish below, greenish purple above; bulbous at base and with thickened nodes at the leaf-scales; 5–7 in. high, often very slender above. LEAVES: pale-colored sheathing scales. SPIKE: a loose raceme of 6–20 flowers on half-inch mounts of slender-pedicelled ovaries.

FLOWERS: Brown, purple, and white, in two halves; upper, sepals and petals ascendant, slightly spread, drooped over the column like a hand; lower, lip thrust forward and deflected. SEPALS: pale purplish green below, brown-purple above, darker on back; lance-linear, 1/6–1/5 in. long; lateral pair falcate. PETALS: pale green edged above with purple; same length as sepals, but wider; clawed at base, pointed at apex. LIP: white, rimmed with violet, and marked at middle with two purple spots; rounded, 1/7 x 1/6 in., spatulate-clawed at base, dilated above into a round petal, rimmed, with hinging folds at base, a second pair at middle, and a fifth at apex, wavy-edged and finely erose; two divergent ridges, united at base, running out from top of claw on to the face of the petal.

PLACE AND TIME: DISTRIBUTION: Gulf States north to Maine, Vermont, Massachusetts, New York, Southern Ontario, and Illinois. HABITAT: mixed woods with a fondness for light sandy soil. SOIL PREFERENCE: intense to moderate acidity. SEASON: late August–October.

SPECIAL FEATURE: An autumn plant, bulbous at base, flowers small, lip roundish.

THE Small-flowered or Autumn Coral Root is a pocket edition of Wister's. It has the same round white and-violet shell of a lip, but is littler by half, has a bulb-like base, and makes its appearance at the opposite end of the summer. It is hardy enough

Plate 125

AUTUMN CORAL ROOT

(*Corallorrhiza odontorhiza*)

Plate 126

AUTUMN CORAL ROOT

(*Corallorrhiza odontorhiza*)

to be included among the famous five rarities once found flowering in southwestern Ontario—White Lady Slippers and Whorled Pogonia in June, Three Birds and Yellow Fringed Orchid in August, Autumn Coral Root, September-October.

The plant stands 5–7 inches in height and is fairly slender. The stem is pale purplish, swelled at the base into the form of a bulb and somewhat "jointed" below, being thickened into nodes at the leaf-scales. The scape and rhachis are often extremely slender. The spike of flowers is loose and moderately wide for its length, the three-panelled ovaries standing out on long pedicels. The flowers are "labiate" in form: the sepals and petals palmate above, slightly spread like the fingers of a small hand; and the lip below, a rounded shell of a petal mounted on a clawed base. The sepals are brownish purple; the petals green, purple-edged above.

The lip is white, decorated with purple. At the centre is a V-shaped ridge like a little wish-bone, each of its divergent outer ends marked with a purple spot. The edges are turned up into a finely crenulate rim with a pair of small folds near the base, a larger pair at the middle, and a fifth in front; the sides are bordered with purple, in continuous lines below, dotted above, and ending at the apex with a pair of conspicuous spots.

The shape of the lip, clawed at the base, and expanding into a single round petal above, clearly distinguishes the Autumn from the Early Coral Root. Its small size, late flowering, and bulbous base, serve equally well to separate it from Wister's. The bulb is very variable in form, now wide-rounded and low like a cyclamen tuber, now ovoid like an onion, or again spindle-shaped. Altogether its corm-like base and coralloid attachments are quite suggestive of Calypso. It appears to grow best in sandy woods.

To the last we never knew just when or where we were going to see this little orchid in flower. Our original scheme of a week-end trip into S.W. Ontario had the bottom knocked out of it when we learned that neither the site nor the season of the plants was

known. Then, four years ago, on friendly word of a lucky find the previous fall, we centred our hopes on Rhode Island; and forthwith, for two seasons running, the plants refused to show up. At last in 1927 we planned to take this Coral Root in on our way to visit Ponthieva; and here, indeed, we met success, though not of our own contriving.

It was on definite news that the Autumn Coral Root could be seen about Washington any September, that we made a short stopover there in the last week of the month. To our dismay we found the orchid only in bud. However, we put the best face we could on the matter and entertained ourselves with hunting out colonies "for future reference" in one of the most delightful spots we know of.

For practice we first repaired to a typical piece of "*odontorhiza* cover": a thinly wooded oak grove, high up and level-floored, with light, dry soil. Among the scattered shrubs we noticed Azalea, Florida Dogwood, and Trumpet Honeysuckle,—orange-berried and with foliage that here in the sunny south was evergreen. Conspicuous among the autumn flowers were Silver Rod—a creamy Solidago, a small Purple Gerardia peculiar to sandy barrens, and two very beautiful Asters, one deep blue, the other purplish with a golden centre. Spotted Wintergreen was also plentiful and the familiar little Partridge Berry, looking its very prettiest with bright red fruit. Nor was it still life only that we met in this grove; gray squirrels raced across the floor, and the leafy-green canopies overhead rang with the jay's harsh cry.

From here, with our 'prentice eyes well focussed, we hurried eagerly over to the "Wood of Delight." We had been introduced to this charming spot at Wister season, and had fallen in love with it at first sight. This was already our fourth visit; from April to August its floors were one long procession of rare and beautiful things. It was a wood of mingled Beech and Oak, Tulip Trees and scattered Pine. Near the entrance stood some shrubs of Black Haw festooned with Wild Yam. The floor here was remarkably

clean, sloping gently down to a central trough; beyond, it rose more steeply to a wide plateau. Ferns were seemingly shy of this cover; a colony of Adder's Tongue on the borders, Virginia Rattlesnake and occasional Christmas Fern being all that we noticed. But the flowering plants were a ceaseless wonder. Among our earliest finds had been Star Grass (*Hypoxis*), a serrate-leaved Skullcap with showy blue flowers, and Wild Monkshood. Putty Root and Crane-fly grew on both slopes, and Lily-leaved Liparis was everywhere. At the heart of the wood was a magic spring; and by the spring, a mossy pool; and in the pool, a band of naiads—Pennsylvania Saxifrage, the Larger Bunch Lily, Chamaelirium, and most enchanting of all, American Cowslip or Shooting Star, a glorified Primula with pink umbel of drooping flowers on long slender pedicels.

For Autumn Coral Root the top of the farther slope looked a likely spot; so up we climbed, past the place where in early summer we had seen Canada Lilies and a single Yellow Lady Slipper, past some patches of Downy Rattlesnake Plantain, and past a great bed of Whorled Pogonia. Hardly had the summit come in sight before we spotted some scattered spikes of the new Coral Root, and eventually three separate colonies were discovered. It was a fitting close to our season's finds in the Wood of Delight.

From this point on we began to find it wherever we went; as a rule in arid sandy soil, but once on a rotten log. We met it at the head of the shady ravine where our first little sprouts of Wister's had been seen; it cropped up on the trail of the Fragrant Tresses; on wood-borders, plateaus and shaded slopes; and, finally, even in gardens; this last, a parting blow as we left for Williamsburg.

And then we had no more than turned our backs on all these budding spikes, when the perfect bloom met us in Southern Virginia. How it lightened the load of our packs as we toiled along by the Slough of Despond, and what a royal welcome it gave us next day even pointing us out a path to more *Ponthieva!*

This last leisurely survey of it stirred curious thoughts and fancies. What queer-looking buds they were! The perianth-parts clamped down on the lip exactly as the upper jaw of a lizard comes down about the lower; and when the flower opened, the effect was still reptilian, but the upper jaw transformed to a foot with spreading toes. How rapidly between bud and flower the ovaries ripened and sagged on their stalks! Its season was certainly earlier farther north, no doubt to escape frost; but how came the plants in the sunny south to lie dormant so long? Were they exhausted by their prolonged activity of the previous season? And finally, what hidden virtue lay in the swollen base, that this orchid should flourish in bone-dry sand, and flower five months later than its big sister *Corallorrhiza Wisteriana?*

V. STRIPED CORAL ROOT

(*Corallorrhiza striata*)

NAMES: Common: Striped Coral Root, Macrae's Coral Root, Bigelow's Coral Root, Madder-stripes. Specific: *striata* (Lindley, 1840) "striped," of the lines on the perianth parts.

PLANT: Scape: madder purple or magenta, stout, 6–18 in. high. Leaves: whitish or pinkish purple sheaths. Spike: 2½–8 in. long, a loose raceme of 15–25 drooping flowers set on half-inch purple-ribbed yellowish ovaries.

FLOWERS: Whitish, tinged and conspicuously striped with purple; ½ in. long, perianth somewhat drooping. Sepals: pale yellowish white with three bright purple stripes running down the face, duller on back; lance-oblong, ⅜ in. long, lateral pair slightly falcate. Petals: whitish, tinged with purple and marked on face with 3 full length striæ and 2 shorter ones of bright purple; oblong-ovate, ½ in. in length. Lip: crystalline-white, purple-tinged, and overlaid with rich plum-purple in 5 strong stripes that are confluent almost from base to tip; tongue-shaped, slightly under ½ in. in length; rimmed on margins and incurved near the base; median line crested below with an oval sulcate boss bevelled in front down to floor-level.

PLACE AND TIME: Distribution: Quebec, Ontario, and Michigan, west to British Columbia, Oregon and California; also authentic recent records in New Brunswick and New York. Habitat: dry wood floors, especially limestone flats under pine, spruce, and cedar. Soil Preference: neutral soil, or only

slightly acid; very abundant in limestone areas of Ontario. SEASON: May-July, occasionally August.

SPECIAL FEATURE: Flowers large, purple-striated, lip tongue-shaped.

THE Striped Coral Root is a large plant with big boldly colored flowers, quite the most striking and handsome of the genus. It is so rare in the eastern half of the United States that many a plant-lover there would "give his eyes to see it" as an Irish correspondent of ours recently wrote. It is described in Gray as a northwestern species, and extends from the Pacific to the Great Lakes region. There are two records for it as far east as Quebec, and we have ourselves found it near St. George, New Brunswick. Though widely distributed throughout the Province of Ontario, it is curiously local—in some districts, not a plant; in others, thousands. It must be extremely hardy, for it has established itself in the Bow River Pass and at the summit of the Selkirks, by the Nipigon River and on the north shore of Lake Superior. Like most of its kind it has a prolonged season of blooming, the individual bunches of Coral Root sending up shoots intermittently for several weeks. We find it in flower quite often by May 20th and from then continuously till July 15th; once even, we have had the rare sight of a flowering spike in September.

The plant is stout and purplish in color; the stem clothed below with two or three sheathing leaf-scales of a pale grayish color tinged with yellow or purple. It stands anywhere from 6 to 18 in. in height and bears a loose spike of 15–25 flowers. These are over half an inch in length and have their sepals and petals all marked with three madder-purple stripes; the ground color of the perianth-parts is crystalline white on the inside, creamy yellow on the outside; the rich purple striations are laid on the inner side and show more dully on the back; they are about as wide as the intervening stripes of uncolored area. Besides these three madder stripes, the petals, and sometimes the sepals, have their margins of the same rich hue. The lip is tongue-shaped and concave, hav-

STRIPED CORAL ROOT

(*Corallorrhiza striata*)

ing its forward margins turned up and incurved; near the base is a conspicuous shield-shaped boss or knob; the overlaid purple color is of a very deep rich madder involving not only the three central stripes, but this raised knob, both margins, and the entire forward half of the lip.

Though the pedicels and ovaries are fairly erect, the flowers have a drooping habit. This causes them at a distance or from above to appear paler than they really are; because what catches the eye is the backs of the sepals, pale yellow suffused with dull purple. More than once when this rare and beautiful orchid has been pointed out in the woods we have known it passed by with indifference. So few really do "give their eyes" to see it.

It is not at all easy to say just what conditions best suit this orchid, because in the only two districts where we have found it at all, it is very abundant and grows in almost every conceivable kind of cover: we have found it in low moist woods of cedar and hemlock, in open rocky hardwoods, on dry floors of spruce and pine, at the tops and bottoms of steep slopes and on upland plateaus; some seasons ago we discovered 30 or 40 plants in one of our city parks, growing under pines in the company of big fleshy cream-colored morels—more than once, indeed, for all four of us, "pine needles and morels" have meant Striped Coral Root. This is certainly an embarrassing wealth of choice; but if we were asked to go and find it in some new district, we should certainly look first under evergreens on dry, rocky floors, especially limestone flats. It is as fond of calcareous rock as some of our ferns, and can even be coaxed out of cover by it—like its kinsman the Crested Coral Root. On limestone benches close to the shore of an island in Lake Huron, we have actually seen plants flourishing in the full glare of the sun, several hundred yards away from the evergreen thickets in which the parent colonies were harbouring.

From early days of orchid-hunting it was one of our cherished ambitions to find this rare and strange Coral Root; an ambition

Plate 128

STRIPED CORAL ROOT

(*Corallorhiza striata*)

long unrealized, though several times we came tantalizingly close to it. During our ten years' stay in the extreme south of Central Ontario, we twice had it sent us for identification, once from the Rideau district and once from North Muskoka; finally, two children, playing in a small wood not a mile distant, came home one day with a large nosegay of the flower spikes. But it was only when we settled thirty miles north of Lake Ontario that we found it actually growing and, to our intense delight, a comparatively plentiful species.

Like most orchids it has, we found, its secrets; one of these is a baffling habit of not reappearing in exactly the same place twice; but at practically all the large stations discovered for it, it has maintained itself for a number of successive seasons, and in one or two it has noticeably increased. The most remarkable of these is a wood about twelve miles away where we have kept the plants under observation since 1921.

In June of that year we were anxious to examine some plants of Hooker's, and repaired to this wood for the purpose. It is of mixed growth and situated on a slope; at the foot of this it spreads out in the form of hardwoods, chiefly beech and maple. The slope is quite steep, broken, and gravelly; and at the top is a plateau of white pine, balsam, spruce, hemlock, and cedar; this plateau forms the upper corner of the wood, and along one side of it runs a road which appears to have cut off part of the wood, for its farther side is bordered by thickets of evergreen. It was in the hardwoods that we first found some colonies of Striped Coral Root; next season there were none there, but we came across a very large colony in the roadway, occupying a clean level piece of floor in the heart of a cedar thicket. In 1923, our biggest clump had vanished, but a few scattered plants were found in its neighborhood, and a fair-sized colony had sprung up under hemlocks near the foot of the slope. Next season the colony under the hemlocks had disappeared and been replaced by a neighboring colony under pines at the northeast angle of the wood.

For three or four seasons, we had omitted to examine closely the plateau of evergreens at the northwest angle. So finding pines the favored tree that season we made our way along the north border in the direction of the plateau. Three-quarters up the slope we suddenly came on a most extraordinary scene. Right above us, the top of the slope and the edge of the plateau for twenty yards or more were crowded with flowering stems of the Striped Coral Root; some idea of the sight may be gained when we say that we counted 523 flowering spikes. They were in three main tiers one above another, sometimes scattered, sometimes closely crowded; along the sides of a fallen pine trunk at the edge of the plateau they thrust out like masses of fungus, at one spot 34 flowering stems in a dense sheaf barely 5 inches in diameter.

Approaching from below we got the full benefit of their purple stripes and richly colored lips, but they had still a surprise in store for us. A few days later we were passing through the neighborhood early in the morning and couldn't resist a short detour to the wood. This time we approached from behind, across the plateau, intending to go down the slope and so get the full effect of the upward view; but there was no need. The sun's rays slanting through the pines struck full on the face of the plateau, and the ranks of Coral Root were lit up with a blood-red glow like rubies or garnets. Until he has seen them in sunlight no one has any idea how beautiful these orchids can be.

XXI

CRESTED CORAL ROOT (*HEXALECTRIS*)

CRESTED CORAL ROOT

(*Hexalectris spicata*)

NAMES: Common: Crested Coral Root, Buff-crest, Cock's Combs, Brunetta. Generic: *Hexalectris* (Rafinesque, 1825), "Six cock's" combs, from the 6–7 fleshy ridges on the face of the lip; Specific: *spicata* (Walter, 1788), "spiked," of the floral raceme.

PLANT: Stem: a stout bracted scape, 1–2 ft. high, with a cluster of stout, coralloid, annulated brittle roots. Leaves: reduced to short, truncate, sheathing scales. Spike: a fairly wide loose raceme.

FLOWERS: Light yellow to buff striped with dark; large and handsome, nearly 1 in. long. Sepals: yellow, with 7 purplish grey-brown striae on the face—showing duller on the back, connate at base; lateral pair, wide ovate, somewhat falcate, recurved on outer third, about $\frac{2}{3} \times \frac{1}{3}$ in.; upper one longer and narrower. Petals: delicate yellow with 7 fine purplish-brown striae; $\frac{3}{4} \times \frac{1}{4}$ in., obovate to oblanceolate, falcate. Lip: pale yellowish white with 4 thin lines of violet on wings and 3 pair of purple ridges each side median line of purple interrupted by white; wide rounded-ovate, 3-lobed, $\frac{11}{16} \times \frac{9}{16}$ in.; basal two-thirds, dilated up-curved wings that clasp the column; apical third, a rounded crisped lobe.

PLACE AND TIME: Distribution: Virginia south to Florida and Gulf States, west to Arizona, Texas and Mexico. Habitat: rocky open woods, especially limestone areas. Soil Preference: neutral, also tolerant of acid, but pushes far north of normal range following shell marl. Season: July–August.

SPECIAL FEATURE: Large handsome buff flowers striped with purplish and many-crested on lip.

The Crested Coral Root is well named; it looks remarkably like a big tropical form of the Striped Coral Root; and, as we shall see later, resembles it quite curiously in some of its habits. Its home is in the south, from Florida to the Carolinas in the east, and west to Northern Mexico and Arizona; anywhere

Plate 129

CRESTED CORAL ROOT

(*Hexalectris spicata*)

Plate 130

CRESTED CORAL ROOT

(*Hexalectris spicata*)

north of this range it is extremely rare. It grows on outcroppings of limestone in thin open woods, and apparently seeks little or no shelter from the sun. The flowering season is July-August.

The rootstocks are somewhat coralline—stout, fleshy, short-jointed, and branching. The flowering stem stands 1–2 feet in height; the scape, which is smooth and stout, bears several short bract-like scales upon it, the lower ones usually truncate, the upper lanceolate. The raceme is 4–9 inches long and has 8–20 flowers. These are an inch in length, fragrant, and strikingly handsome owing to their unusual color and the rich decoration of the lip. They are buff, marked with dark striae and dusted over the back with gray bloom; the sepals are longer than the petals and curled outward forward of the middle; all five have seven narrow lines of brown running down their length. The lip is widely obovate and three-lobed, being dilated on the basal two-thirds into a pair of erect rounded wings which clasp the top of the curving column, and prolonged into an ovate apex with crisped margins. The ground color of the lip is creamy; its basal wings are marked with four narrow curving lines of violet; and its floor is decorated along the median line by a central ridge of violet on the basal half, white above the middle, and violet again toward the apex. On each side of this stand three pair of erect thin fleshy flanges or crests of rich purple—like the gills of a mushroom. It is to these that the Crested Coral Root owes its name of "Six-Cock's-Combs" (*Hexalectris*).

The finding of this plant, last of all the long series of our native orchids in Gray, quite fittingly closed a very arduous trip made in 1925 down through North Carolina and Tennessee; by dint of ten days' continuous travel and effort we were able to round up three very rare and to us inaccessible orchids, thereby filling the only serious gaps left in our lists.

We northerners really need quite a lot of acclimatization to enjoy a trip in the south; and there was so much to do in so short a time that we simply had to keep going, hard, from first to last,

regardless of conditions, or write down *Failure* instead of *Finis.* Had we sat down and waited to get used to things, we'd have been there yet with nothing done; that's our private opinion. You see it was all concentrated essence of orchid hunting; we had three long journeys on end to make by rail; in the intervals we had to unpack, track down the field stations, discover our plants, make set-ups, take pictures, develop, dry, and then re-pack. And when we wound up at Nashville, Tenn., the thermometer stood at 113 degrees Fahr. in the shade.

The pleasure, we kept dinning into our ears when things were at their worst, would come by way of retrospect; and so most wonderfully it has. The pictures speak for themselves; the photographer thinks they might have been better, but to us—knowing all the hardships and handicaps, the marvel is rather how they came to be so good.

It was on the morning of July 3d that we stepped off at the little wayside station near where the Crested Coral Root grows. The heat was terrific; the very ground seemed charged with it, and one's whole body seemed full of little aches and nervous twitches as though an electric storm—or even an earthquake—were brewing. Leaving our coats at the depot, we made our way slowly down the tracks till the surrounding country showed indications that we were near the place. We then left the right-of-way and sat down near the fence to rest before starting in on our search.

There was little or no protection from the sun in the cover we were about to examine—open, rocky woods with frequent outcroppings of limestone. Drawing a blank here, we climbed a side-fence, and, slowly, but with all our hunting faculties alert, "moused" about through some young mixed woods, open like the first and nearly level. Presently we discovered a spike of what looked like the Spotted Coral Root; the sight of it was most discouraging, only 5 inches high and with its spike of tightly appressed buds nearly flat and quite undeveloped. We dug it up,

however, and confirmed the identification. In its roots this saprophyte is much more like *Corallorrhiza* than *Tipularia*.

The root we examined was thick, fleshy and nearly white, consisting of a main spindle with many smaller spindles projecting from it more or less haphazard; all the parts made up of closely joined sections; it was not very brittle, but when bent sufficiently always broke at these sections. The stem was solid, brownish-yellow, and armed with three or four short, wide, closely appressed clasping bracts; near the base and just above each bract in succession the stem was darkest and became paler as it approached the next; it was perfectly smooth without either bloom or pubescence.

After a while we found two much more fully-grown plants 10–14 in. high; but none of the buds had opened yet, and we decided to try our luck in another place. Returning to the railway we followed it till we came to a sharp curve and a cutting; here we noticed on one side of the track a considerable area of open woods with pronounced outcroppings of limestone. A wire fence at right angles to the railway intersected the area, and after failing on one side we climbed over to the other. At last luck was with us—a big spike with three open blossoms. Both buds and blossoms, we noticed, have a striped effect on the outside or back of the perianth; this is almost certainly due to the dark-brown stripes on the inside or face of the sepals, and not to the brilliant violet-purple stripes which give such glorious color to the lip with its three pairs of crisped ridges or crests. Altogether, apart from their unique and distinctive color of buff, the flowers are remarkably like those of *Corallorrhiza striata*. And just two weeks before the photographer recorded these notes in Tennessee, his partners in Ontario had discovered immense quantities of Striped Coral Root in the Fishing Islands of Lake Huron, *growing on limestone flats* and sometimes *right in the open* in glaring sunshine; quite a coincidence of habit at any rate, if not revealing any inward affinity.

A further point of resemblance between the two might be mentioned: for such highly specialized showy blossoms, they both have

an unusually long flowering season; on the northern frontier of its range, the Crested Coral Root has been observed to bloom, in one and the same season, over a period of five successive weeks.

As soon as we had found this first plant with open flowers, we blazed a trail back to the railway from it, determined to take no chances on camera work at our next visit. Returning we soon found others, fifteen in all, scattered over half a mile of territory; one of them measured up to the photographer's knee-cap. They were all growing among slabs and boulders of limestone ledges in mixed open woods; the ground was rough and rocky and one of the plants was standing stark on a nearly bare flat slab; the homeliest of surroundings, nothing could ever make them romantic—woods and fields alike, parched and withered; but the Crested Coral Root in their midst always fresh, plump and juicy, fleshy-brittle flowers a perfect miracle of brilliance and delicately fragrant like Rose Pogonia.

One most interesting field observation will always be associated in our minds with this plant. To the professional, perhaps, it is a matter too commonplace for remark. We refer to the process by which an orchid converts its lip from an upper petal to a lower. We had never noticed either when or how the change is made until we came to take our portrait of *Hexalectris spicata*. By running your eye rapidly down from the top of the spike to the bottom, you can actually get an ocular demonstration of the whole process. The young bud is upright, but as it approaches maturity a double movement of the pedicel both downward and rotary takes place; this gives the flower a half turn and at the same time thrusts it out from the stem. It is in no sense a mere sagging due to weight; it is co-ordinated and purposeful, like the voluntary turn, by wrist-play, of a hand under control.

The sight of these stems of Crested Coral Root, with their gorgeous-colored blossoms, thriving so lustily on the sun baked slope, seemed in some strange way to rob us of half our fatigue; and when, on making our way back to the railway, loaded down

with the camera, we came all at once upon a great trailing vine—the first we had ever seen—of Passion Flower covered with blossom, we lost the last remnant of bodily discomfort. We shall never forget the sight, and it will always be linked up with our trail of the Crested Coral Root.

CLANS (*GENERA*)
AND KEYS TO SPECIES

CLANS (*GENERA*) AND KEYS TO SPECIES

i. The Lady Slippers

Our Moccasin Flowers are no more admirable for their beauty than for the device by which the couriers of the air—chiefly bees—are pressed into their service. The insect guest entering the cup by the open door of the hatchway in the top finds it impossible to use the entrance as an exit owing to the steep smooth walls of the dome and the inflected edges of the opening. Its attention is soon attracted to the pair of light-shafts at the back of its prison, and, making a rope ladder out of the fringe of hairs which it has already sampled for nectar, it brushes past the rough surface of the stigma, then past one or other of the anthers and so escapes; quite unconscious that the stigma has searched it for any pollen it brought in to the flower, and the anther has given it a fresh packet to carry to its next-door neighbor.

In all Europe there is but one Lady Slipper—the Yellow. We have ten, six of them east of the Mississippi, the other four peculiar to the west. Among our eastern forms are two of peculiar interest: the Pink Moccasin, in which the edges of the middle petal or slipper are not entirely welded together, and the Ram's Head whose lateral pair of sepals are not joined into one. The double lower sepal is a protection to the cup, which is peculiarly delicate on its highly inflated under surface. The Ram's Head which lacks this protection has the inflated part of its cup uppermost and tapers below to a blunt and not very vulnerable point. Our species may be distinguished as follows:

A. Lateral sepals entirely separate. 1. The Ram's Head.

B. Lateral sepals welded together except at the tip.
Lip golden. 2. The Yellow Lady Slipper.
Lip polished white, purple-veined within; upper sepal lanceolate. 3. The White Lady Slipper.
Lip soft white, purple-spotted within; upper sepal round, green. 4. Franklin's Lady Slipper.

C. Lateral sepals entirely welded together.

Lip white to mauve, purple-flushed on the face, spherical; upper sepal round, white. 5. The Queen Lady Slipper.

Lip white to pale pink, rose-veined on the face, obovate; fissured in front. 6. The Stemless Lady Slipper.

ii. The Orchises

It is a curious thing that while there are more than thirty species of Orchis in Europe, we have but three and one of these is confined to Alaska. By way of compensation, we have more than twenty of the sister group, Rein-orchid, which in Europe makes but a small handful. Another curious thing is that the pair of biennial tubers so conspicuous in practically all the European species of Orchis as well as in some kindred groups, are wanting in both our species and in most of the Rein-orchids. The technical difference between *Orchis* and *Habenaria*—the little winged bracket in which the rostellum encloses the sticky discs attached to the ends of the pollinia—is fairly evident in the large flowers of *Orchis spectabilis;* but in any case their appearance makes it easy to tell them from one another as well as from the sister group.

Scape with one leaf at base.

Lip white spotted with purple, hastately lobed at base, cleft at apex; 3 parts of perianth together forming a mauve cap over the column. 1. The Small Round-leaf Orchis.

Scape with two leaves at base.

Lip white, tongue-shaped; 5 parts of perianth together forming a mauve hood over the column. 2. The Showy Orchis.

iii. The Rein-orchids

With upward of twenty species in the territory of Gray's *Manual* and more than thirty between East and West this generic group can hold its own with any European clan in the Tribe. If the flowers are smaller than those of Orchis, they are much more numerous and the spikes make a beautiful display. The Fringed

Orchids, of which we have no fewer than eight, are peculiar to our northeast, and their soft lacy heads of inflorescence in orange, white, green, mauve, and purple are one of Nature's masterpieces. When Europe's botanists were first called on to find names for some of these it would almost look as though they realized that here was America's answer to the European Eyebrow Orchids with their imitation bees and spiders; for Linnæus called our Purple Fringed '*psycodes*'—The Butterfly, and Willdenow's name for our White Fringed was '*blephariglottis*'—The Eyelid or Eyelash Orchid. In the following key the Rein-orchids will be found arranged according to the shape of the lip and other characters easy to determine.

I. Lip not fringed, nor three-parted into wedge-shaped divisions (cf. The Purple Fringeless.)

A. Lip with small lobes or teeth.

Lip hastately 2-lobed at base, tubercled on face.
1. The Tubercled Orchid.

Lip 2-lobed (or very unequally 3-lobed) at apex.
2. The Bracted Orchid.

Lip deep-cleft at apex into 3 long equal lobes.
3. The Newfoundland Orchid.

Lip shallow-notched at apex into 3 short equal teeth.
4. The Little Club-spur.

Lip cut-toothed to crenulate, flowers golden.
5. The Yellow Fringeless.

B. Lip entire, without lobes or teeth, strap-shaped.

(*a*) Leafy-stemmed.

Lip uppermost, spur longer than ovary, elbowed.
6. The Snowy Orchid.

Lip below, lanceolate, tapering uniformly from base to tip, spur shorter than ovary, flowers green.
7. The Tall Leafy Green.

Lip below, widened into lozenge-shape at base, lance-oblong above, spur shorter than ovary, flowers white.
8. The Tall Leafy White.

(*b*) Leaves basal.

Leaves 2–4, oblanceolate, lip short, spur shorter than ovary. 9. The Alaska Orchid.

Leaves 1, or occasionally 2, oblanceolate, lip long, lance-

linear, spur equalling ovary. 10. The Blunt-leaf Orchid.
Leaves 2, large, round, lip oblong, spur club-thickened, longer than ovary. 11. The Large Round-leaved Orchid.
Leaves 2, not so large, lip lanceolate, spur awl-shaped, longer than ovary. 12. Hooker's Round-leaved.

II. Lip fringed or three-parted into large wedge-shaped lobes (cf. The Purple Fringeless.)

C. Lip tongue-shaped, fringed.
Flowers orange, spur shorter than ovary. 13. The Crested Orchid.
Flowers orange, larger, spur longer than ovary. 14. The Yellow Fringed Orchid.
Flowers white, spur longer than ovary. 15. The White Fringed Orchid.

D. Lip three-parted into large wedge-shaped lobes, mostly fringed (exc. The Purple Fringeless).
Wedge-lobes fringed almost to base, flowers yellowish or whitish green. 16. The Ragged Orchid.
Wedge-lobes less deeply fringed, flowers larger, white, fragrant. 17. The Prairie Fringed Orchid.
Flowers mauve, ½-in. across, spike usually dense, crowded. 18. The Small Purple Fringed Orchid.
Flowers mauve, 1 in. across, spike usually loose, fewer-flowered. 19. The Large Purple Fringed Orchid.
Flowers phlox-purple, wedge-lobes not fringed but eroded on margin. 20. The Purple Fringeless.

iv. The Twayblades

This group with their quaint pair of leaves mounted high on the stem are an old favorite. The Heart-leaved is "at home" almost everywhere in the northern hemisphere—America, Greenland, Iceland, Europe, and Japan. The splitting of the lip down the middle is so distinctive a feature and so exactly that of the Bird's Nest Orchid that we are not surprised to find in both the same device for mailing their pollen-packets by air route. The rostellum is provided with a spring gun which shoots a pellet of liquid glue at the insect visitor. It has never been known to miss. The range is very small; but so are the marksman and the target

—a fly's eye. In every member of the clan the median line is sunk into a groove which secretes nectar; along this insects advance from the fork of the apical lobes to where the groove stops—just under the column. Reference has been made to this groove in the description of the Northern Twayblade. The Twayblade has developed along two main lines, each of which is well illustrated by the two British species; the cosmopolitan Heart-leaved with tiny flowers—both column and perianth—designed for minute insects only, and the big stout Oval Twayblade with large flowers and a lip widened out into a spacious platform. Six of the seven species of North America are found in the east.

A. Flowers minute, lip split into a pair of bristle-prongs.

Lip armed at the base with a pair of teeth erected at maturity. 1. The Heart-leaved.

Lip armed with a tooth in the fork of the apical lobes. 2. The Southern.

B. Flowers larger, lip expanded into a platform.

(*a*) Lip rounded-oblong, narrowest at middle, auricled at base.

Auricles small, parallel, incurved, terminating in a point on the side next the column, leaves mostly broad. 3. The Auricled.

Auricles large, divergent, coming to a point on the side remote from the column; leaves mostly narrow. 4. The Northern.

(*b*) Lip wedge-shaped, widest at apex.

Lip mounted on a claw and armed at the basal corners of the expanded blade with a pair of small triangular teeth, hardly cleft at apex; leaves wide-ovate. 5. The Broad-leaved.

Lip armed at the base with a pair of large oblong teeth, deep-cleft at apex into a pair of spreading rounded wings, leaves kidney-shaped, mucronate. 6. Small's Twayblade.

V–X. The Crest-lips

This group of seven are easily recognized by their crested lips. The flowers being solitary or few are comparatively large and

showy—unquestioned queens of beauty in their Tribe. They have so many peculiar features, even in their common heritage of the crest, that there is little danger of confusion. It may be noted that in the Grass Pink, the Arethusa, and the Rose Pogonia, the lip is not three-lobed. This trio all have the surface of the lip picked up into so copious a "beard" that insect visitors have all the purchase and guidance necessary. In the more lightly crested forms, lateral clefts—rudimentary in the Snake Mouth—are well developed; thus the basal wings can be turned up into a pair of lateral walls and yet not interfere with the office of the apex as a landing-stage. Quite the most strikingly odd of all the seven are the Ettercap (Large Whorled Crest-lip) and the Three Birds (Nodding Crest-lip); the first for the waxy character of its crest, its long-drawn-out sepals, all three alike, the middle one unmodified for connivence with the petals, and most of all the primitive form of its whorled foliage, a feature unique among the Orchids and without a parallel nearer than the Lilies; the Three Birds for its strange habit of flowering and still stranger system of underground tubers.

A. Leafy-stemmed.

(*a*) One leaf near middle of stem and a leafy bract at summit.
Sepals and petals alike. v. The Rose Crest-lip.
Sepals and petals unlike. vi. The Spreading Funnel-crest.

(*b*) Leaves in a whorl of five at summit of stem.
Sepals and petals very unequal.
vii. 1. The Large Whorl-crest.
Sepals and petals nearly equal.
vii. 2. The Small Whorl-crest.

(*c*) Leaves alternate, several, singly at the joints, scoop-like; roots tuberous. viii. The Nodding-crest.

B. Leaves basal, grass-like, plant produced from a bulb or corm, inflorescence showy, rose-purple.

Flower solitary, lip below. ix. The Arethusa.
Flowers several, lip above. x. The Grass-pink.

xi. The Helleborine

Our common Helleborine or Sauce-box of the east is not a native orchid. It came to us from Europe where there are six or eight similar orchids belonging to two closely kindred clans. The group which includes our Helleborine is known in Great Britain as *Epipactis* or *Serapias*, and its cousin group as *Cephalanthera*. Unfortunately, investigation has shown that the name *Epipactis* belongs of right to Rattlesnake Plantains, and *Serapias* to the *Cephalanthera* group. It therefore became necessary to find a new name for our Sauce-box and her sister the western Chatterbox. In compliment to Prof. Oakes Ames whose Orchid studies are famous all the world over, the authors of the latest monograph on the subject have christened them *Amesia*. Both *Amesia* and *Serapias* are represented in our native flora, but only in the west, by a single species each—the Giant Helleborine or Chatterbox, whose lip being loose-hinged is never still, and the Phantom Orchid—a colorless saprophyte of ghostly white. The true Helleborine has a rostellum, a stalkless anther and a stalked ovary—the spiral twist required to bring the lip into position occurring in the stalk below the ovary; the Serapias group, including the Phantom Orchid, has no rostellum, a broad-stalked anther, and a stalkless ovary—which perforce is spirally twisted. This Orchid is almost entirely pollinated by wasps; its sauce-boat of nectar fitted in front with a spout for insects to settle on is very interesting for its likeness and unlikeness to the lip of the Rattlesnake Plantains and their kinsman Ponthieu's Orchid, with its resupinate flowers. As we have but one species, the description given in the body of the book will serve for the genus.

xi. The Helleborine.

xii. The Ladies' Tresses

These pretty Pearl-twists with their spiral spikes of snow-white bloom are general favorites. The lip is channelled down the mid-

dle much as in the Twayblades, but instead of being flat it is trough-shaped; not by the floor being sunk into a pit like that of the Helleborine or the Rattlesnake Plantains, but by up-curving of the sides. The entrance to the nectary is greatly narrowed by a pair of fleshy tubercles at the angles of the lip-base.

In Europe there are but three Ladies' Tresses and one of them is our Hooded (Romanzoff's). We have 15, of which 9 occur in Gray's Territory. It makes an embarrassing wealth, for some of them are difficult to distinguish; and the problem is further complicated by the presence of local "races," the occurrence of hybrids, and the probable confusion of one or two orchids of widely different range that are really distinct species.

A. Flowers arranged in a single rank.

Leaves ovate, disappearing at inflorescence.
Root of a solitary spindle; lip entirely white.
1. Beck's Ladies' Tresses.
Root of several spindles; lip with a broad central stripe of green. 2. The Slender Ladies' Tresses.
Leaves lance-linear, grass-like, persistent.
Plant abundant in dry grasslands of Maryland and New Jersey, flowering in July. 3. The Spring Ladies' Tresses.
Plant abundant in wet sedgy boglands of New Jersey and the south, flowering at the north of its range in late August and September. 4. The Giant Ladies' Tresses.

B. Flowers arranged in several ranks.

Leaves lance-oblong, fleshy; stem short; lip with a broad stripe of saffron; flowering May–July.
5. The Shining Ladies' Tresses.
Leaves longer, not fleshy; stem tall, spike short, oval, lip white, slightly flared; flowering Sept.–Oct.
6. The Oval Ladies' Tresses.
Stem tall, spike long; lip tongue-shaped, long down-curved, and strongly flared on apical half, nipples at base prominent; 3 parts of the perianth forming a cap over the column, lateral sepals free; flowering late August to October.
7. The Nodding Ladies' Tresses.
Plant very large and tall, roots freely stoloniferous; lip slightly contracted at sides, median line flanked with a pair

of yellowish cushions; confined to tidal river marshes.
8. The Fragrant Ladies' Tresses.

Lip strongly contracted below the apex into fiddle-form; tip sharply deflected, not strongly flared; nipples not prominent; 5 parts of the perianth forming a hood over the column; flowering July–August.
9. Romanzoff's Ladies' Tresses.

xiii. The Rattlesnake Plantains

This group differs from the Ladies' Tresses chiefly in the form of the lip. It lacks the pair of nipples at the base, and as if to offset this feature, it has the basal half deepened into the form of a pouch; the apical half forms a landing-stage, but is not wavy-crisped on the margin. The foliage is well developed and evergreen. It is to the leaves that the group owes its name—"Rattlesnake" from their white mottling, "Plantain" from their forming a basal rosette. There are four members of the group.

A. Apical half of lip prolonged and not sharply deflected; rostellum with a pair of very long mandibles.

Lip bulbous rather than saccate, widened and deepened gradually toward base; floral spike one-sided.
1. Menzies' Rattlesnake Plantain.

Lip strongly saccate, apical half blunt-oblong; floral spike not one-sided. 2. The Tesselated Rattlesnake Plantain.

B. Apical half of lip sharply deflected, or else very short; mandibles of rostellum quite short.

Lip strongly saccate, tapering to a point and sharply deflected on apical half; floral spike one-sided.
3. The Lesser Rattlesnake Plantain.

Lip very strongly saccate and inflated, apical half very short, broadly triangular; floral spike not one-sided.
4. The Downy Rattlesnake Plantain.

xiv. Ponthieu's Orchid

This Orchid belongs to a small group of southern range. It has very evident affinities with several other members of the Bird's Nest Tribe. Its foliage though not evergreen has the same form

of a basal rosette as the Rattlesnake Plantains; and its sauce-boat lip suggests both them and the Helleborine. The resupinate blossoms as in the Grass Pink have led to most unusual changes of structure, as witness the landing-stage of two petals united with a sepal, and the device for transferring the pollinia to an insect's back, so exactly paralleling the Bog Malaxis. As the group contains but one member, the description in the body of the book will serve for the genus as well.

xiv. Ponthieu's Orchid.

xv–xvi. The Adder's Mouths and False Twayblades

These two groups differ more in size than in structure. They may both be compared with Lister's Twayblades, the minute flowers of the Adder's Mouths with those of the Heart-leaved and Southern, the larger flowers of the False Twayblades with those of the Auricled and Broad-leaved; indeed, the mauve scutcheon of *Liparis liliifolia* is in size and shape almost the exact counterpart of the green scutcheon of *Listera convallarioides*. The members of the group are all produced from corms; and there has been remarked in several of them a strong tendency to come up to the surface of the ground. The rare little Bog Malaxis is said in Great Britain to grow *on* the moss rather than *in*; its successive corms are produced above the old corm, and we ourselves found several plants near Thunder Cape growing on logs or behind flakes of bark on cedar and spruce stumps; the corms of the White Adder's Mouth and both species of Liparis frequently work out to the surface. These are the only two groups of the Tribe with well-developed green "summer" leaves. We have four of the Adder's Mouth group and two False Twayblades. They may be distinguished as follows:

xv. The Adder's Mouths.

A. Flowers with lip uppermost.

Spike narrow, flowers almost sessile, lip striped with

grass-green; leaves several. 1. The Bog Adder's Mouth.
Spike wide, flowers long-stalked, lip marked with an orange disc; leaves two. 2. The Florida Adder's Mouth.

B. Flowers with lip below.

Spike narrow, flowers very short-stalked, lip roundish at base, narrow-lanceolate above; leaf, one, loosely sheathing, pale green. 3. The White Adder's Mouth.
Spike wide, flowers long-stalked, lip 3-lobed at apex; leaf one, closely sheathing, rich green.
4. The Green Adder's Mouth.

xvi. The False Twayblades.

Lip broad wedge-shaped, flat, mauve streaked with purple veins. 1. The Lily-leaved Twayblade.
Lip narrow wedge-shaped, convex, yellowish green.
2. Loesel's Twayblade.

xvii–xix. The Winter-leaf Group

These three orchids are alike in having a single "winter-leaf" and an underground system of biennial corms. As each is sole in its clan, the specific description in the body of the book will serve for the genus as well. The extraordinary beauty of Calypso has made it famous all the world over. We associate it inevitably with the depths of evergreen woods; yet in the summer of 1929 we saw it flowering by scores and hundreds, close-gathered in bare turf on the shores of the Mingan Islands and at Cape Norman in the Belle Isle Straits—both limestone regions. The Crane-fly is peculiar in having often three or four of its bolster-like corms connected horizontally in an unbroken series. The Putty Root on the contrary shows nearly always a pair. Its southern name of Adam and Eve is almost certainly of mediæval origin. In the Orkney Islands and probably other parts of the world, all orchids are known as Adam and Eve because of their tell-tale roots; and the children amuse themselves by divorcing the pair of corms and dropping them into a bowl of water, to see the bad man Adam sink, while Eve triumphantly floats like a modern witch.

A wrinkle worth having about all three of the winter-leaf

orchids is this—the leaf being green from October to May forms a conspicuous object in a wood when everything else is brown; the best time to detect the presence of these orchids is before the winter snows fall or just after they melt.

Leaf small, oval, green both sides, flower solitary, shoe-like. xvii. Calypso.

Leaf small, oval, purple on under-side, flowers many in a long loose raceme, small, long-spurred. xviii. The Crane-fly.

Leaf large and long, green both sides, flowers comparatively few in a loose raceme, large, spurless, pale yellow, inconspicuous. xix. The Putty Root.

XX–XXI. THE CORAL ROOTS

The Crested Coral Root (*Hexalectris*) forms a group by itself. Its roots are not nearly so coral-like or brittle as those of a true Coral Root; they are really stout rootstocks annulated at the joints. The large flowers of this southern saprophyte, with their rich and unusual colors, cannot fail to arouse admiration. It is very rare within our limits, and the two occasions when we met it in Virginia will long be remembered.

The true Coral Roots, a group of 5, have really no roots at all. The masses of coral are nothing but underground stems, much branched and toothed. This is part of the price they pay for their habit of life; they have no green in stem or foliage; the leaves are reduced to a series of purple or yellowish sheaths, and the flowers are either lurid or cadaverous to look at. They are peculiar in the possession of a small spur adnate to the ovary and formed by the union of the lip-base with the bases of the lateral sepals. The members of the group are not very difficult to distinguish.

xx. The Coral Roots.

A. Lip somewhat hastately 3-lobed, with a pair of lateral slits or clefts near the middle, quadrate or wedge-oblong.

Plant smaller, slenderer, pale yellowish-white; lip white, sometimes sparsely dotted with purple. 1. The Early Coral Root.

Plant larger, stouter, usually purple-stemmed; lip white spotted with purple; spur conspicuous, adnate to ovary. 2. The Spotted Coral Root.

B. Lip not 3-lobed, but with a pair of lateral folds, rounded in form and somewhat frilled on margin.

Plant larger, lip white, strongly spotted with purple, southern in range, flowering in spring.
3. Wister's Coral Root.

Plant smaller, lip white more lightly purple-spotted, flowering September-October.
4. The Autumn Coral Root.

C. Lip, entire-edged, tongue-shaped, all parts of perianth boldly striated with 3–5 madder stripes.
5. The Striped Coral Root.

xxi. The Crested Coral Root.

Roots somewhat coralline, stout, annulate, brittle at joints, perianth buff striped with dark, lip with 3 pair of fleshy ridges like mushroom gills on either side of the median line. 1. The Crested Coral Root.

KEY TO GENERA

Tribe I. Fertile anthers 2, borne on the sides of the column. Lip an inflated pouch, never produced in front into a more or less expanded lobe (cf. *Calypso*). Sepals 3, the lateral pair (except in *Cypripedium arietinum*) normally coherent behind the lip, so that the flower appears to be composed of five perianth segments. i. Cypripedium.

(Tribes II IV.) Fertile anther 1. Lip simple or complex: if saccate, produced in front into a more or less expanded lobe; or if simply saccate, forming the uppermost segment of the perianth.

Tribe II. Anther on top of column, *persistent*, attached by a broad base, rigid, not attached to column by a filament or thread; with 2 distinct cells or compartments united by a broad connective. Pollen-bundles tapering into caudicles or tail-like appendages which emerge from the *base* of the erect anther-cells. Lip (not the sepals) developed at base into a spur or saccate nectary (*Basitonæ*).

a. Sticky disk of the pollen-bundles enclosed in a pouch-like structure of the rostellum. ii. Orchis

aa. Sticky disk of the pollen-bundles free. iii. Habenaria.

(Tribes III and IV.) Anther on top or back of column, often fastened by a slender filament or thread, often detaching itself or coming away easily with the pollen-bundles, *rarely persistent*, *rigid and fixed* (as in *Triphora*). Base of pollen-bundles or tapering caudicles (if present), emerging from the *top* of the anther. Lip rarely produced into a spur or pouch (*Acrotonæ*).

Tribe III. Pollen-bundles readily disintegrating: granular or mealy; when cohering in masses, never hard or waxy.

b. Anther on top not on back of column.

c. Leaves solitary or several, if in pairs distantly alternate; in *Arethusa* inconspicuous, developing late.

d. Anther easily moved, not rigid.

e. Pollen-bundles mealy, grains not held together by elastic threads.

f. Lip not pouch-like at base.

g. Leaves solitary or alternate.

h. Lip less than 1 in. long. iv. Pogonia.

hh. Lip more than 1 in. long. v. Cleistes.

gg. Leaves 5–6 in a whorl. vi. Isotria.

ff. Lip pouch-like at base. vii. Amesia.

ee. Pollen-bundles held together by elastic threads.

i. Flowers several. viii. Calopogon.

ii. Flowers solitary. ix. Arethusa.

dd. Anther rigid, erect. x. Triphora.
cc. Leaves opposite. xi. Listera.
bb. Anther on back of column below summit.
j. Lip forming uppermost segment of perianth. xii. Ponthieva.
jj. Lip forming lowermost segment of perianth.
k. Roots in a bundle at base of stem, or sometimes single (cf. *Sp. Beckii*); rhizome not distinctly creeping with roots at the nodes. xiii. Spiranthes.
kk. Roots from nodes of a creeping rhizome. xiv. Epipactis.

Tribe IV. Pollen-bundles waxy, forming definite masses in which the pollen grains cohere closely. Flower-shoot terminal from a corm or coralloid rhizome, often clasped by a sheathing leaf-base. Leaves, wanting in *Corallorrhiza* and *Hexalectris*, represented at flowering time in *Tipularia* and often in *Aplectrum* by withered fragments or fibres.

l. Rhizome not coralloid or only rarely so in Calypso.
m. Leaves always present at flowering time on corm.
n. Lip not pouch-like.
o. Column short. xv. Malaxis.
oo. Column long. xvi. Liparis.
nn. Lip pouch-like. xvii. Calypso.
mm. Leaves absent at flowering time, or present as withered remains.
p. Lip with a long slender spur at base. xviii. Tipularia.
pp. Lip without a long slender spur. xix. Aplectrum.
ll. Rhizome coralloid.
q. Pollen-bundles 8. xx. Hexalectris.
qq. Pollen-bundles 4. xxi. Corallorrhiza.

GLOSSARY

acid	used of soil the reverse of alkaline, e. g., granite, peat, sphagnum, etc.
adnate	naturally joined to or forming part of; usually of dissimilar unions, e. g., the spur of *Corallorrhiza maculata* is adnate to the ovary.
annulate	with ring-like joints.
anther	the pollen-bearing vessel surmounting the stamen.
apicle	a small tooth or point at the tip, often of the median line of the lip projecting into a small lobe.
appressed	lying flat against.
ascendant	rising, often of a flower standing out on the stem above horizontal.
auricles	a pair of projecting lobes like small ears.
austral	southern.
awl-shaped	tapering to a slender point.
axil	the angle formed by a leaf with the stem.
axillary	of flowers produced in the angle of a leaf.
biennial	lasting for two years.
bifurcate	forking into two.
blade	the expanded part of a leaf, lip, etc.
boreal	northern.
bract	a small leaf on stem, scape, or rhachis.
bulbil	a small bulb or bud from which a new plant is formed, as on the leaf-margin of *Malaxis paludosa*.
bursicle	a receptacle like a small purse or pouch.
calcicole	of a plant that loves the neutral soil of limestone or shell-marl.
calyx	the outer covering of a bud or flower, consisting of three sepals in the orchids.
capsule	the seed-case, said of the matured ovary.
carpel	a single compartment of the pistil, containing ovules.
caudicle	a small tail or extension at one end of the pollinia or pollen-bundles.
ciliate	fringed with hairs on the margin—like eyelashes.
clavate	thickened at one end like a club.
clavellate	slightly thickened at the end.
claw	a narrowed base at the point of insertion, below the expanded part of a lip, petal, or sepal.
clinandrium	a small receptacle at the top of the column of an orchid in which the anther rests.

coherent	of two similar parts in close contact.
column	the small pillar at the top of the ovary, made up of style and stamens welded together.
conduplicate	folded together lengthwise.
confluent	running into each other, blending, e. g., of the white veining in the leaf-rosettes of *Epipactis ophioides*.
connate	naturally growing or joined together, of similar parts, e. g., the lateral sepals of most *Cypripedia*.
connivent	converging, "putting their heads together," e. g., the middle sepal and lateral petals connive over the column in many orchids.
coralloid	like coral, e. g., the roots of *Hexalectris*.
cordate	heart-shaped.
corm	the enlarged fleshy base of a stem, as though a solid bulb.
corolla	the inner ring of three petals, or in the orchid the lip and pair of petals.
crenate	cut on the margin into rounded teeth.
crenulate	slightly cut-toothed.
crystalline	of the "frosted" texture of petals or lip, e. g., in the flowers of the Ladies' Tresses.
cuneate	wedge-shaped, wider at apex than at base.
deciduous	falling early, of leaves or flowers that soon wither.
decurrent	extending down below the point of insertion.
deflexed	bent down.
descendant	standing out from the stem below the horizontal.
dilated	widened at the sides.
dimorphism	having two forms.
elliptic	narrowly oval.
entire	without divisions, lobes, or teeth, generally used of a smooth-margined lip, etc.
epiphyte	growing on or attached to a tree, said of tropical orchids.
eroded or erose	cut on the margin into a series of alternate small teeth and hollows, as though gnawed by a caterpillar.
falcate	curved and flat like a sickle-blade.
filament	the thread-like stalk of a stamen supporting the anther.
filiform	thread-like.
flared	widened out at the apex.
frontal	as though situated on the brow or forehead.
fusiform	spindle-shaped.
galea	a helmet, used of the caplike formation when sepals and petals connive over the column.
glandular-pubescent	used of leaves, stem, etc., when clothed with fine gland-bearing hairs.

globose	inflated into globular form.
habitat	the conditions of haunt or home in which a plant grows.
hastate	with a pair of basal lobes that stand out almost at right angles.
hirsute	clothed with rather coarse hair.
hyaline	transparent, especially of translucent margins.
indifferent	used of a plant that flourishes equally in acid and in neutral soil.
inflorescence	blossom or time of blossoming.
labiate	formed like a mouth with upper and lower lips.
lanceolate	long, narrow, and tapering to a point.
linear	very narrow and parallel-sided.
lip	the middle—originally the upper—petal of an orchid, mostly enlarged and modified.
lobe	a rounded expansion of lip, sepal, or petal.
median	middle, usually of the mid-vein running lengthwise from base to tip of an orchid-lip.
monotypic	sole of its form, said of a genus represented by a single species.
mucronate	ending suddenly in a projecting sharp point.
nectary	the hollow sac or spur containing nectar.
neutral	of soil that is not acid but limy.
node	the knot or joint on a stem, where usually a leaf appears.
oblanceolate	long and narrow, but broadening outward.
obovate	egg-shaped, with the big end outward.
obsolete	inconspicuous or disappearing, generally of a lobe or excrescence abnormally diminished.
obtuse	blunt-rounded at the outer end.
olivaceous	somewhat olive or yellowish-green.
oppose	to stand opposite.
orbicular	of a round, disc-like shape, used to denote the flat surface of a leaf, etc.
oval	tapering equally both ways into a round end.
ovary	the young seed-case or capsule on which the column and flower of an orchid stand.
ovate	egg-shaped with the smaller end outward.
ovoid	like an egg in shape, mostly of a flat surface—leaf, petal, etc.
palmate	with radiating lobes like the spread fingers of a hand, e. g., the sepals and petals of Calypso or *Corallorrhiza Wisteriana*.
pandurate	fiddle-shaped, compressed at the sides between base and apex as though with a narrow waist.

parasite	of a plant that feeds on or at the expense of another living plant.
pedicel	the stalk by which a single flower is attached to the stem.
peduncle	the stalk by which several flowers are attached to the stem.
perianth	the segments of a flower more or less showy which surround the column, i. e., the sepals, the petals and lip of an orchid.
persistent	not withering or dropping after inflorescence.
petal	one of the inner segments of the perianth; in the orchid a lateral pair, the middle one being modified into a lip.
petaloid	having the appearance of a lip.
petiole	the footstalk of a leaf.
pistil	the seed-bearing organ of a flower, made up of ovary, style (however short or obsolete), and stigma.
pollen	the fertilizing grains contained in the anther.
pollinia	the bundles or masses in which an orchid's pollen usually coheres.
puberulent	minutely pubescent.
pubescent	with fine, soft hair.
quadrate	broadly oblong or square.
raceme	an elongated head of inflorescence which is wide owing to the individual flowers standing out on long ovary-pedicels.
radial	with radiating symmetrical parts as in a lily.
recurrent	extending (or growing) backward.
reflexed	bent back on itself or downward abruptly.
resupinate	lying on its back as though facing upward, referring to an orchid-flower having the lip uppermost.
reticulate	forming a fine network.
revolute	rolled back, of the margin of a leaf, petal, etc.
rhachis	the axis of a flower-spike or a raceme.
rhizome	a prostrate or subterranean stem, usually rooting at its nodes and becoming erect at the end.
rhomboid	lozenge-shaped.
ringent	gaping, as though with an open mouth of distended upper and lower jaws.
rostellum	a little beak or small extension above the stigma.
sac	cup or pouch.
saccate	formed like a cup or pouch.
saprophyte	a plant that grows on and derives its nourishment from rotting vegetation, dead branches, leaves, etc.

scape	the leafless stalk on which the inflorescence, spike, or raceme, is borne.
secund	borne along one side of an axis, e. g., of a tier of successive flowers in the spike of *Spiranthes*.
segment	a division or lobe, especially of a sepal or petal as being a uniform part of calyx or corolla.
sepal	one of the outer lobes of the perianth, a segment of the calyx.
sessile	without a footstalk, of a flower or leaf that sits close to the point of insertion.
simple	not complex or compound, often used of the lip of an orchid when single in form.
sinuate	having a wavy outline, usually applied to a margin.
spatulate	spoon-shaped, like a long, narrow wedge, slightly broadening outward.
spike	an elongated head of inflorescence, that is narrow because the individual flowers are sessile or stand on short erected pedicels.
stamen	a pollen-bearing organ, consisting ordinarily of a filament or thread-like stalk surmounted by an anther.
staminode	like a stamen, applied to a modified sterile stamen.
stem	the main ascending axis of a plant, bearing leaves as well as flowers.
stigma	the sticky disc at the top of the style or, in an orchid, at the top of the column, which receives the pollen.
stoloniferous	bearing stolons or runners that root, of an orchid which produces new plants from runners.
striated	marked with parallel lines or striæ.
style	the narrowed neck above the ovary that is surmounted by the stigma.
sulcate	having a sulca or furrow.
tolerant	of a plant that while not indifferent to a certain soil reaction can endure some amount of the opposite.
truncate	ending abruptly as though cut square across.
tubercled	having a small protuberance like a wart or nipple, as, e. g., on the lip of *Habenaria flava*.
ventricose	strongly inflated or bellied out, e. g., the lip of *Epipactis pubescens*.
villous	densely clothed with long soft hair.
wedge	of a lip that broadens strongly outward.
whorl	of leaves forming a ring or circle round the stem.

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